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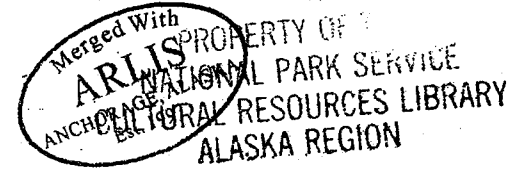
BLM Archeology
Papers Presented at the:

Sixth Annual
ALASKA ANTHROPOLOGICAL
ASSOCIATION
Conference

University of Alaska
April 6-7, 1979



U.S. Department the Interior
Bureau of Land Management
Fairbanks District Office
Fairbanks, Alaska



BLM ARCHEOLOGY; PAPERS PRESENTED AT THE SIXTH ANNUAL MEETING OF THE
ALASKA ANTHROPOLOGICAL ASSOCIATION
University of Alaska- Fairbanks
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INTRODUCTION:

The Fairbanks District Office of the Bureau of Land Management, U.S. Department of the Interior hired an archeologist for the first time in September, 1975. The Fairbanks District is comprised of large Federal holdings in the northern half of the State of Alaska and is divided into five management units: the Arctic-Kobuk Resource Area, the Yukon Resource Area, the Forty-mile Resource Area, the National Petroleum Reserve-Alaska, and the Utility Corridor. Five archeologists are currently employed by the Fairbanks District and their investigations are supported by the facilities of an archeology laboratory provided by the District.

The papers assembled here were presented by Fairbanks District archeologists at the Sixth Annual Meeting of the Alaska Anthropological Association held at the University of Alaska, Fairbanks on April 6-7, 1979. Howard Smith is the District Archeologist and operates as a member of the District Manager's resources staff. Robert Gal, Michael Kunz, and Peter Bowers all work as archeologists/environmental monitors on the National Petroleum Reserve-Alaska Project Staff and conduct archeological field investigations cooperatively with Edwin S. Hall Jr., U.S. Geological Survey archeologist working in the Office of National Petroleum Reserve-Alaska.

To introduce the papers pertaining to investigations in NPR-A, we have included a summary of work that the BLM and USGS have carried out since June, 1977. This summary was submitted to the Current Research editor of American Antiquity in January, 1979. The paper by Kunz follows and provides a preliminary descriptive overview of the archeological investigations conducted to assess and mitigate the direct, indirect, and secondary impacts of the construction and operation of a drilling pad and airstrip in the Otuk and Iteriak drainages in NPR-A. The paper by Bowers is a preliminary discussion of the excavations and findings at KIR-096, one of the sites in the Iteriak drainage, located on borrow site #1 for the Lisburne wellsite. Gal's paper illustrates some useful, and points out some possible archeological applications of available small-scale false-color infrared photographs and describes investigations planned in conjunction with the NPR-A impact assessment activities. Two other papers were presented by Gal and Bowers at the meetings and are not available for distribution at this time. Gal's paper "Strategies..." details the approach employed in NPR-A excavations at the Tunalik Site in 1977 and at the Lisburne Site in 1978. Bower's paper on Carlo Creek is a final report of research he conducted prior to joining BLM. Abstracts of these papers appear at the end of this collection. Accepting a conservation model for archeology, Smith explores the necessity for and potential problems with implementing a standing and a regional archeological research design.

The papers presented here have been hurriedly assembled and are not in final form. Final and polished versions will be published shortly. Our intent at this time is to disseminate data and ideas in a timely fashion and to solicit comments. Inquiries and comments should be directed to the individual authors at:

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Recent Field Investigations in NPR-A

Edwin S. Hall Jr. (USGS/SUNY-Brockport), Robert Gal, Peter Bowers, Michael Kunz (BLM-Fairbanks) continued a joint USGS/BLM program of cultural resource management in the 23 million acre National Petroleum Reserve in Alaska (Formerly the Naval Petroleum Reserve No. 4: PET-4). The USGS is managing a petroleum exploration program through its operator, Husky Oil, and the BLM is responsible for surface protection in discharging Interior's mandate (P.L. 94-253) to explore the Reserve and assess its petroleum potential. Since the spring of 1977, USGS and BLM archeologists have coordinated closely with Husky Oil engineers during summer pre-construction planning of oil exploration activities for the subsequent winter, and have conducted aerial and pedestrian survey and subsurface testing of proposed wellsites, haul roads, material sites and seismic lines. During the summers of 1977 and 1978 more than seventy sites were located in or near proposed areas of operation (17 wellsites). The significance of each site was assessed and in nearly all cases, impacts were mitigated by avoidance of the cultural resource. Avoidance was considered imprudent in six cases; these sites were excavated to mitigate adverse impacts.

During the summer of 1977 three sites were excavated. Two small Norton/ Ipiutak sites were excavated at Material sites Nos. 1 and 2 for the South Meade No. 1 wellsite. Both sites occurred in dune deposits along an old channel of the Meade River in the Arctic Coastal Plain Province, 15 miles northeast of the village of Atkasook. South Meade Material Site No. 1 (XMR-091) contained three discrete concentrations of cultural materials, two of which produced diagnostic materials. Debitage was scarce, suggesting short-term occupancy. A flake-knife and an end or side-blade fragment was recovered from one concentration in which material occurred from surface to about 10 cm below surface. The other concentration producing diagnostic pieces was located at the edge of the old river channel where in situdebitage was recovered from surface to 10 cm below surface. Seven end or side-blade fragments and a fragment of a flake-knife or scraper were recovered from this concentration.

The dune deposits at South Meade Material Source No. 2 (XMR-093) formed on the inside of an old river meander, now an oxbow lake. Debitage was initially recovered from a deflated unvegetated surface below the vegetated crest of a linear dune. Excavations revealed a paleosol which extended under the dune crest from the area of the original find. Debitage was sparse; all material except for one small flake was grey-green chert. A single semi-lunar side-blade fragment was recovered. An historic component was also identified at the site and consisted of drilled and pegged wood fragments strewn widely over surface -- assumed

1

Paper submitted to Current Research Editor, Far North, American Antiquity, January, 1979.

to be a sled. No sled runners were recovered. A human mandible was also recovered from surface. The sled fragments and the mandible may be associated, permitting speculations of a sled burial or a winter traveller's undoing. Carbon samples collected at the lithic concentrations at both South Meade sites were submitted to the USGS for radiometric analysis.²

Major efforts during the summer of 1977 focused on the excavation of a site located on Material Source No. 1 for the Tunalik wellsite. Tunalik Material Source No. 1 is located approximately fifteen miles southeast of Icy Cape in the Arctic Coastal Plain Province. The site (WAI-091) is located on an old beach remnant which approximately follows the 100' contour and trends SW-NE from the Utukok River toward the village of Wainwright. This old beach becomes less well defined to the southwest.

The beach is composed of sands with gravel as large as 2 inches. The surface of the site is armoured with as much as 5 cm of deflation-lag gravels. An estimated 90% of the surface was unvegetated; all cultural material was recovered from surface or within the gravel pavement. Ten discrete (spatially segregated) concentrations were identified and excavated; these extended over 900 feet along the beach. No hearths, features, or structural remains were encountered and no organics for dating were recovered.

The small size of these concentrations and the paucity of debitage (769 flakes and 388 microblades were recovered from the entire site) would suggest short-term occupancy. Concentrations range from 60 square feet to over 900 square feet though a few isolated pieces occurred between concentrations. The different concentrations may represent different activity areas of the same occupation or separate occupations but a combination of the two is assumed. Artifacts were made of grey chert, black chert, and red jasper. While the typological inventories of each of the concentrations are not identical, there is sufficient mutual repetition of forms within the concentrations to suggest that most, if not all, associations within a concentration are valid. Some of the core and blade technology is similar to that described for the American Paleo-arctic Tradition: wedge cores and tablets, microblades. Notched flake-burins and lateral burins on large blades or blade-like flakes can also be assigned to the APA tradition as can a small tabular core biface and the large blades.

Other elements are reminiscent of Kayuk: lanceolate projectile points of thick lenticular cross-section and large thin bifaces. Northern Archaic Tradition relations may be posited on the basis of the lanceolate points and the large elongate biface of thick cross-section, the large straight-edged uniface of black chert, the chopper, and the projectile

² Since this summary was submitted, the following C-14 dates have been received for South Meade: 1420± 110 B.P., 820± 140 B.P., and 1260±65 B.P. A fourth sample yielded a date of <220 B.P. at 26.

point with multiple lateral burin blows. The oval platformed microblade core, and core tablets with multiple platform preparation flakes removed from all margins of the platform, a flake knife (?), dihedral burin, are reminiscent of Arctic Small Tool tradition sites. WAI-091 is considered a prime, though updated candidate supporting Anderson's 1972 postulation of a continuity between the American Paleo-Arctic Tradition and the Arctic Small Tool Tradition. The Northern Archaic elements represented at the site and the microblade technology would also support Anderson's association of these elements at the NR-5 site on the Noatak River. The possible association of American Paleo-Arctic, Northern Archaic and Arctic Small Tool elements at WAI-091 may necessitate a reinterpretation of the apparent discontinuity of these traditions originally suggested by the Onion Portage sequence. Even if the Northern Archaic elements are considered intrusive at WAI-091, a supposed boreal forest technology on the tundra of the North Slope, 4 miles from the Arctic Ocean and more than a hundred miles north of the present tree-line begs explanation. A description and analysis of the materials will be finished for publication in spring, 1979.

IMP ★

During the 1978 season two other locations along this old beach were examined; at both places (WAI-093, WAI-094) debitage was encountered. One of these sites (WAI-093) displays a core and blade technology and large bifaces which suggests the site may closely replicate and perhaps augment the finds at Tunalik.

D.

Excavation efforts during the 1978 season focused upon material sites proposed for the Lisburne wellsite, in the Otuk-Iteriak valley in the Arctic Foothills (Southern Section) Province of Alaska's north slope, approximately 30 miles northeast of Howard Pass. Three sites located on the bluffs on the east side of Iteriak Creek were partially excavated (only KIR-097 was completed) and a fourth site was systematically mapped and surface collected.

E.

A small concentration of debitage (KIR-097) at surface prompted test excavations at Material Source No. 2. Excavations of six 4' x 4' grid units enabled recovery of all cultural material. A possible stone-ringed hearth (lacking ash or charcoal) was located near the lithic material but no debitage was recovered from the hearth area itself. About one thousand flakes were recovered from the remainder of the site. Some crude biface fragments and a broken discoidal scraper, possibly burinated, were the only artifacts recovered.

An extensive site (KIR-100) was located on Material Source No. 5. Excavation of one hundred fifty non-systematic shovel test pits and eight 4' by 4' grid units disclosed that cultural material was scattered

F.

over 400' along the bluff edge. Because of the time and personnel constraints, Husky Oil engineers were informed that excavation to mitigate impacts could not be accomplished and the material source should not be used. The density of flakes suggested a primary reduction workshop similar to that encountered on Material Source No. 1 (see below). Large crude bifaces or flake core bifaces and a "rotated" flake core similar to "rotated cores" at the Gallagher Flint Station were recovered. The distal half of a well-flaked, large elongate knife biface of thick cross-section was also recovered during testing and assessment of the site.

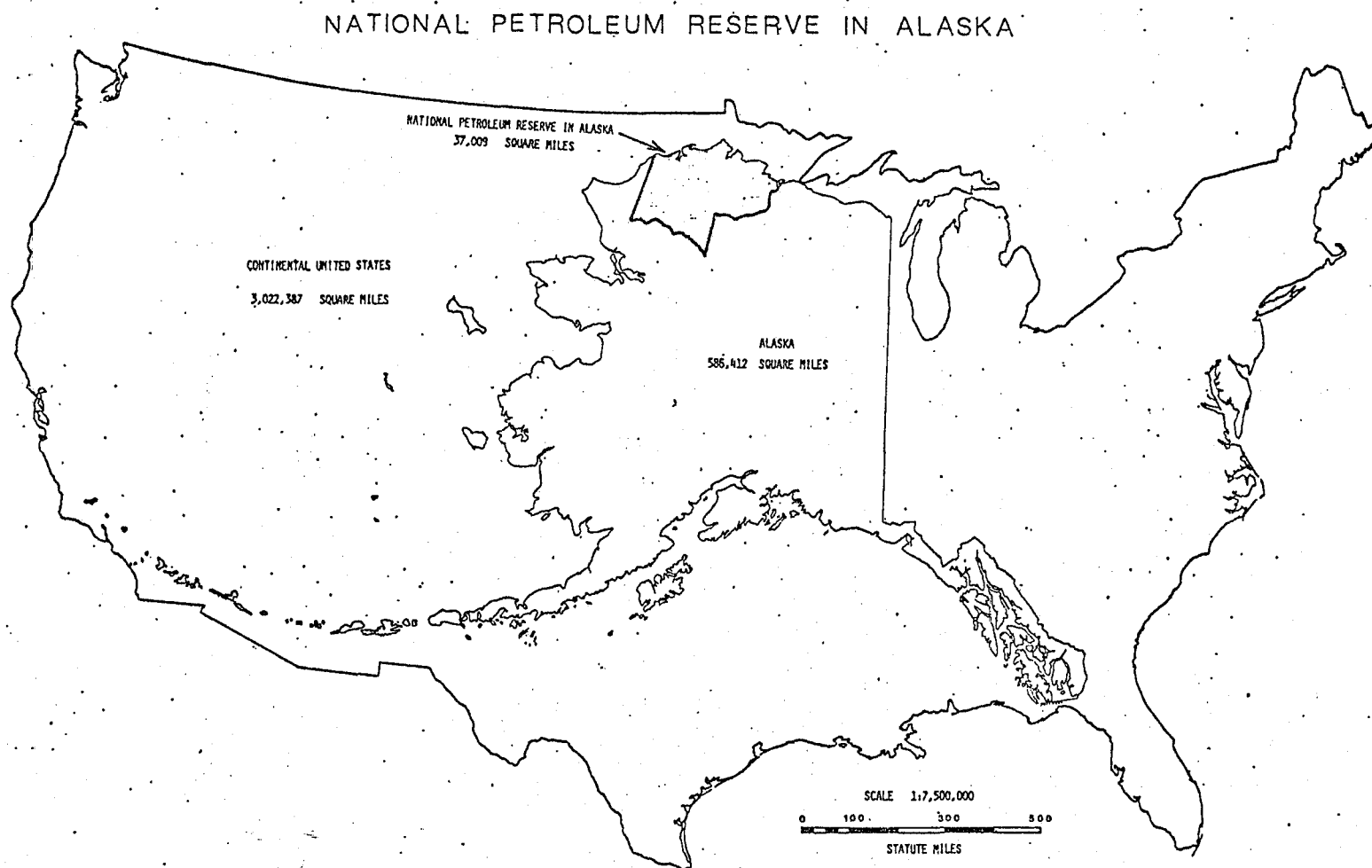
A large prominent bedrock monument at the southern end of the Iteriak-Otuk Valley was proposed as an engineering survey control point. To avert possible disturbance of the materials on surface, the site (KIR-102: Mesa Site) was mapped with alidade and plane table and all recognizable surface artifacts were mapped in and collected. A permanent datum was emplaced for future reference. The Mesa Site commands an unimpeded view of the entire valley and probably served as a lookout point. No evidence of core and blade technology was found. The artifacts show some affinity with forms recovered from the Northern Archaic bands at Onion Portage and possibly with Kayuk and Choris assemblages. Knives or spear points with rounded to subconcave bases were recovered; these have expanding lateral margins, some are basically thinned and edge-ground. A single large straight-edged uniface of dark grey chert was found. Knife bifaces were of three forms. The distal end of a large semi-lunar biface and a complete small elongate biface with a straight base are single representatives of Onion Portage Northern Archaic forms. The large semi-lunar specimen also recalls Kayuk forms. Distal and medial sections and assorted fragments of large elongate knife bifaces of thick cross-section are better represented. The full significance of this apparent Northern Archaic site on the tundra will only be realized through further field investigations.

G MESA SITE

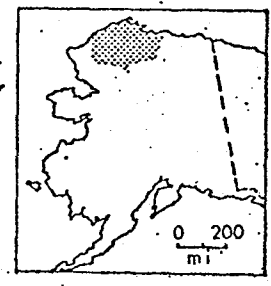
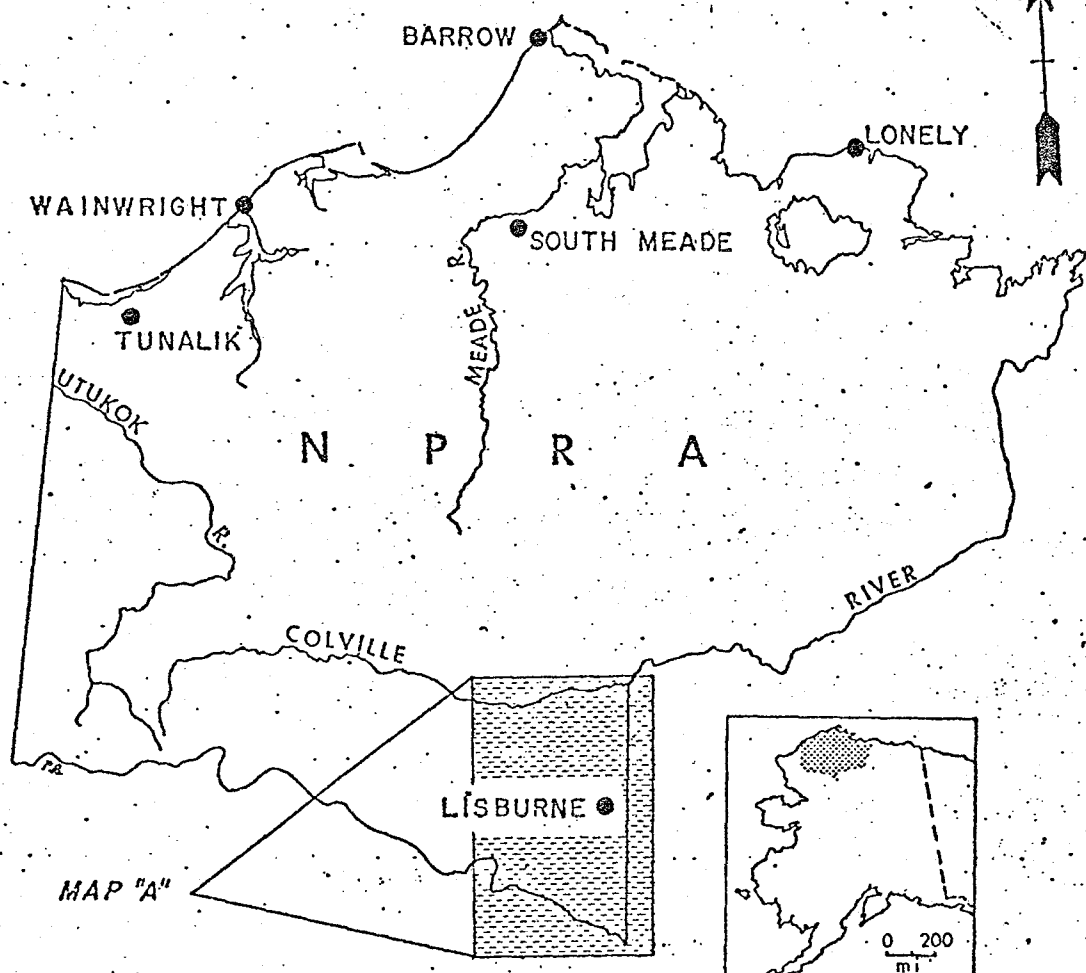
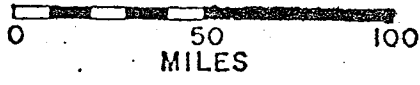
Excavation efforts in 1978 concentrated on a large primary reduction workshop (KIR-096) on Material Source No. 1. Soils at the site are poorly formed and are generally less than 12" deep. The northern portion of the site is fractured chert bedrock, mostly unvegetated and lacking developed soils. Organics were poorly preserved and no hearths, structural remains or other features were encountered. No charcoal for radiometric analysis was recovered. Systematic surface examination and intensive and systematic subsurface testing suggested four major concentrations of cultural material. Within 2 of the 4 localities, a number of discrete activity loci were identified. Ready access to Iteriak Creek and an excellent view of the Otuk-Iteriak Valley combine to make the location ideal for hunting; while readily available chert provided

H, Lisburne

raw materials for tool production. Preliminary analysis indicates that 97% (N = 24,000) of the lithics at the site are unmodified debitage representing primary reduction. The presence of both tabular and cobble-cortex specimens suggest some quarrying of the chert bedrock, as well as selection of chert cobbles from Iteriak Creek. Obsidian is rare, as less than a dozen microblades or microblade-like pieces of obsidian were recovered. Artifacts recovered from the site can be related typologically to the American Paleo-Arctic, Northern Archaic, and Arctic Small Tool traditions of Northwestern Alaska. A series of large, percussion flaked blade cores are technologically similar to the Akmak, Driftwood and Gallagher Flint Station assemblages. Small wedge-shaped cores with platform tablets removed from the faceted end are also represented. Notched flake burins and lateral burins on blade-like flakes occur. A single fluted point is reminiscent of finds along the Utukok River and at the Putu site. Northern Archaic forms include a shallow-notched, basically thinned point or knife with grinding in the notches, large elongate bifaces of thick cross-section, large semi-lunar bifaces, small elongate bifaces; and small semi-lunar bifaces. These biface forms, however, are fairly crude, as may be expected at a workshop site. Noticably lacking are ob lanceolate points and the end scrapers ubiquitous in O. P. bands 5-7. ASTt related forms are represented by small end blades, drills, a shaved burin, and a small variety flake-knife (drill?). The functional, seasonal and culture historical significance of KIR-096 will be better understood once the distribution of artifacts within the site is plotted. All of the NPR-A collections currently reside at the BLM Archeology Lab and are available for study; the University of Alaska Museum, Fairbanks is the final repository. Final reports are in progress and will be published for wide dissemination.



Map taken directly from Schneider and Bowers (1977), Assessment of the Known Cultural Resources In the National Petroleum Reserve - Alaska. Occasional Paper No. 3, Cooperative Park Studies Unit, Anthropology and Historic Preservation, University of Alaska, Fairbanks. Page 40.



ARCHEOLOGICAL SURVEY IN THE OTUK AND
ITERIAK CREEK DRAINAGES, ALASKA

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Paper Prepared for the Sixth Annual Alaska
Anthropology Conference, April 6-7, 1979
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Archeological Survey in the Otuk and
Iteriak Creek Drainages, Alaska

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Abstract

As a means of insuring compliance with 36 CFR 800 (Procedures for the Protection of Historic and Cultural Properties) in the National Petroleum Reserve in Alaska, the U. S. Geological Survey and the Bureau of Land Management jointly engaged in a program of archeological survey and mitigation during the summer of 1978.

Archeological investigations were conducted in areas of proposed operations (areas of oil exploration by U. S. Geological Survey through their operator Husky Oil NPR Operations, Inc.). Areas of operations included the locations of well sites, borrow sites, ice air strips, all season air strips, ice roads and winter trails. Anticipating the possibility of secondary impact, surrounding the Lisburne well site complex archeological survey of the general area was undertaken.

The Lisburne well site complex lies between two tributaries of the East Fork of the Etivluk River in the Northern Foothills province of the Brooks Range, approximately 30 miles northeast of Howard Pass.

Survey was conducted during the month of July at which time over 20 archeological sites were located in the two stream drainages.

This paper is a brief, descriptive site by site report of our preliminary findings.

LOCATION

Iteriak (Inupiat for weasel or ermine) and Otuk Creeks are the two major tributaries of the East Fork of the Etivluk River. The two streams comprise the major drainage system of the operations area of the Lisburne well site. The two streams head about three miles (4.8 km) apart on the northern slope of the Brooks Range at an elevation of 3500 feet (1050 meters). The streams flow north roughly 21 miles (33.6 km) to their mutual confluence and flow an additional 4 miles (6.4 km) to the East Fork of the Etivluk River. The area (roughly 220 sq. miles; 352.9 sq. km) drained by these streams is located within T. 33 N. - T. 9 S. and R. 17 W. - R. 16 W., Killik River Quadrangle. The Lisburne well site is located on the west side of Otuk Creek at 68°29'N, 155°41.5' W and was central to the archeological reconnaissance of the two drainages.

PHYSIOGRAPHIC SETTING

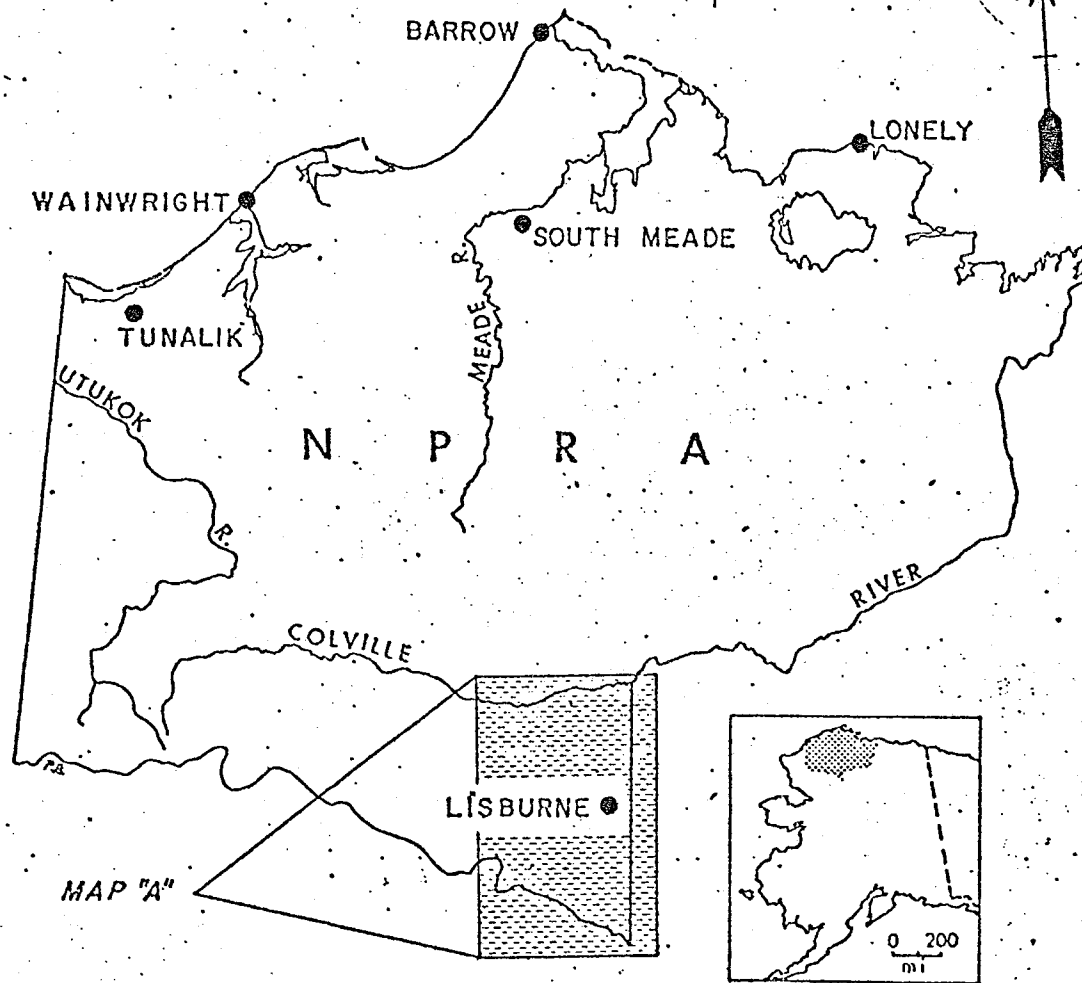
The Iteriak/Otuk drainage system overlies the boundary area of two major physiographic provinces of Arctic Alaska. These are: the Arctic Mountains and the Southern Foothills of the North Slope.

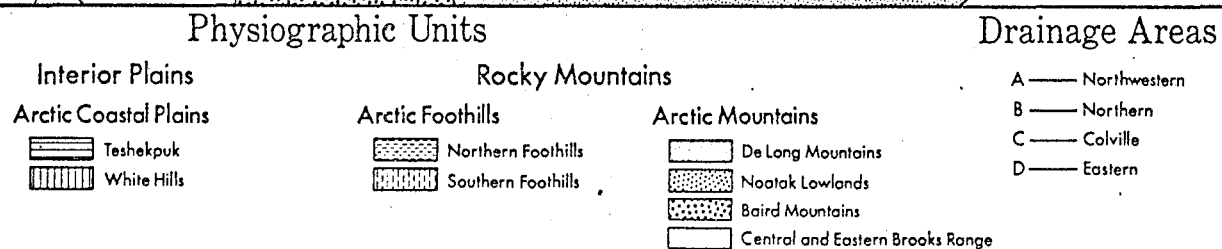
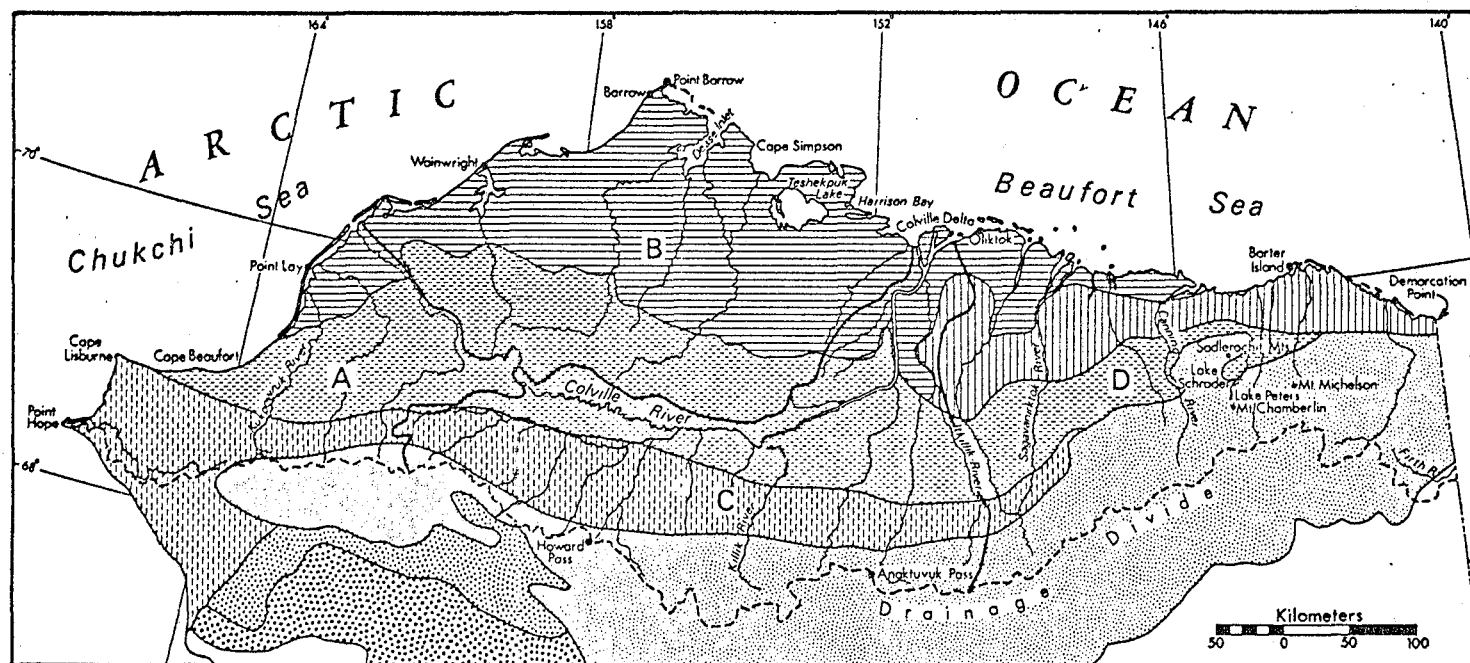
The general topography of the Arctic Mountains of this region is characterized by barren glaciated peaks and ridges of 4000-5200 feet (1200-1560 meters) elevation. The Range has cliff and bench slopes with abrupt mountain fronts along the north face (Warhaftig, 1965). Major valleys were glaciated and rivers and streams flow north to the Colville River which in turn flows into the Beaufort Sea at Harrison Bay.

The Southern Foothills range in elevation from 1200-3500 feet (350-1050 meters) creating a local relief of up to 2500 feet (750 meters). This region is typified by large areas of rolling tundra broken up by buttes, hills, mesas, and ridges to create a landscape of pronounced local relief (Alaska Regional Profiles).

Geologically, this portion of the Brooks Range/Southern Foothills is composed of shale, limestone, sandstone, siltstone and chert of the Mississippian, Permian, Triassic, and Cretaceous periods. In many cases the bedrock structures are overlain by unconsolidated alluvial deposits of the Pleistocene and recent Epochs (Alaska Regional Profiles).

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MILES





Physiographic provinces, drainage regions, and key locations of the North Slope.

Map taken directly from Walker (1973), IN: Britton (ed.) Alaskan Arctic Tundra, Arctic Institute of North America, Technical Paper No. 25, page 50.

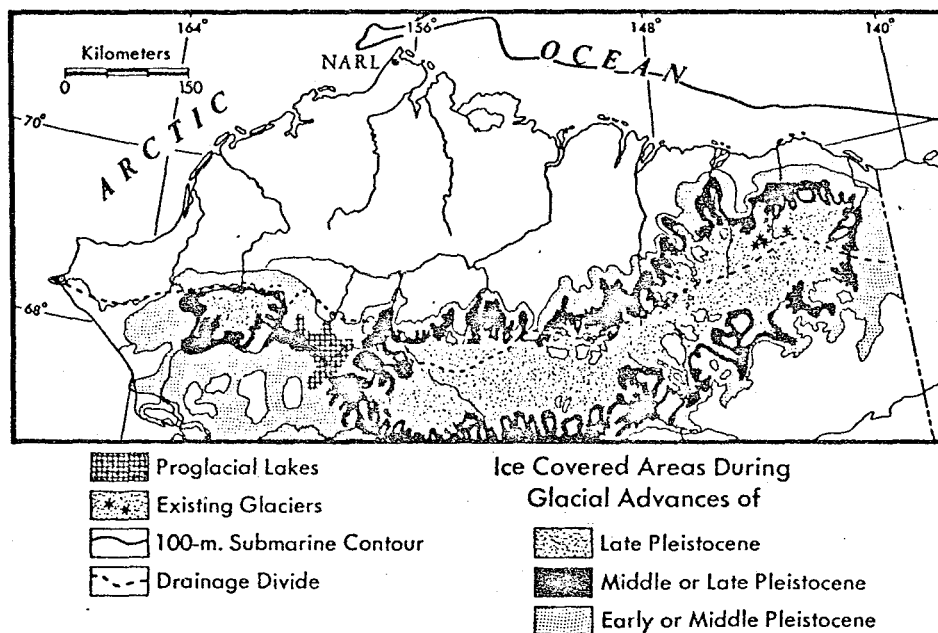
CLIMATE

The climate of this region today is Arctic Continental. Annual precipitation averages 10-15 inches (25-37 cm); the majority of which is the result of snowfall rather than rain (annual snow fall ranges from 40-60 inches (100-150 cm). Snow may fall during any month of the year while rain is most likely to occur in late summer and early fall. Average mid summer temperatures range from a maximum of 52°F (11°C) to a minimum of 40°F (5°C) while average mid winter temperatures range from a maximum of -4°F (-20°C) to a minimum of -16°F (-27°C). Extreme summer temperatures may range from a maximum of 70°F (22°C) to a minimum of 20°F (-8°C) and winter extremes may range from 40°F (4°C) to -65°F (-53°C). Based on regional studies the prevailing winds are from west for the period November through April at an average speed of 5.8 knots (6.7 mph). For the months May through October the prevailing winds are from the east at an average speed of 6.1 knots (7.0 mph). On an annual basis the winds are calm 17% of the time. Extreme winds of up to 70 knots (80.5 mph) and six days duration have been recorded in the region. In winter wind chill factor temperatures lower than -100°F (-72°C) can occur. Daylight is continuous (24 hours per day) in the region from early May through early August. During the winter twilight only occurs (the sun never rises above the horizon) from mid December through mid January. Rivers and streams become ice free between mid April and mid May while some lakes and ponds may not be ice free until late June. The active soil zone (non permafrost layer from the surface down which freezes and thaws seasonally) is usually thawed by late May or early June and has begun to freeze again by early to mid September (Alaska Regional Profiles).

The climate of the past (excepting the hypsithermal), however, was different enough (more precipitation and possibly a bit cooler annually) to promote the formation of Pleistocene montane glaciers. Geomorphology and general environment of the region, as well as the search for evidence of man's habitation and utilization of the area, is closely linked with past glacial activity.

GLACIAL HISTORY

During late Pleistocene, the Brooks Range supported a rather extensive mountain-glacier complex which included the Ivotuk area. Ice advanced as much as 50 km (31 miles) north of the range proper encompassing much of the Southern Foothills (Hamilton & Porter, 1975). This last major glacial advance was termed the Itkillik Glaciation by Detterman (1953) and has been correlated to late Wisconsin glacial epoch (Hamilton & Porter, 1975).



Extent of glaciation in northern Alaska.

Map taken directly from Walker (1973), Morphology of the North Slope, IN: Britton, M.E., (ed.) Alaskan Arctic Tundra, Arctic Institute of North America, Technical Paper No. 25. Page 67.

The Itkillik Glaciation has been divided into two major phases; I and II and two lesser movements termed Itkillik III and Alapah Mountain. The Itkillik I advance began approximately 25,000 years ago and reached its outermost limits between 20,000 and 17,000 years ago (Hamilton and Porter, 1975). The Itkillik II advance occurred about 14,000 years ago and was followed by a period of ice stagnation and down wasting which was basically responsible for the formation and courses of present day lakes and rivers as well as ice contact features such as kames, kame terraces, and moraines. Taking into account the two minor readvances following the Itkillik II phase the glaciers had retreated to present day limits sometime between 11,000 and 6000 years ago (Hamilton and Porter, 1975). As Campbell (1962) mentioned, the surface modifications which resulted from the Itkillik glaciation have had a definite effect on human activity in the area. The streams and lakes provide a fishery resource while the ice contact features may serve as vantage points and cover for sighting and ambushing game, as well as dry elevated habitation locales.

SOILS

Formation and deposition of Arctic soils is a slow process inhibited by low temperature, low rainfall, frost action, and rapid erosion. Arctic soils are generally unsuited for the preservation of organic materials as they are usually shallow and somewhat acidic in nature. The major processes of Arctic soil formations are podzolization and gleization resulting in five basic soil types (Britton, 1957). Lithosols occur in the mountains where rapid erosion severely limits soil accumulations. Regosols occur on depositional features and exhibit poorly developed or absent profiles due to the recency of deposition. Arctic brown is the only soil which may display a well developed profile and is considered zonal. The key factor for this type of soil development is adequate drainage. As a result it is found on ridge tops and other well drained and relatively stable land forms such as glacial features. This is fortunate as most archeological sites in the region are also found on these types of features. The poorly drained tundra soils result from a gleization process and are so disrupted by cryoturbation that profile designations have little meaning. There are two types of tundra soils. Upland, occurring on gentle rolling slopes and meadow, occurring in flatter, less well drained areas. Bog soils occur in areas of standing water and are characterized by an accumulation of organic material which may exceed 15 cm in depth (Britton, 1957).

The Ivotuk area displays all of these soil types to some degree, however, the most prevalent soils are as well drained to poorly drained gravelly

soils with a dark non-acid upper layer and a shallow to deep permafrost table. Associated conditions affecting the area soils are a majority of slopes steeper than 12% and medium to high erosional potential (Alaska Regional Profiles).

Most of the archeological sites in the Ivotuk area are mantled with an Arctic brown soil (shallow phase) of the inceptisol order (Tedrow and Hill, 1961). Parent material includes limestone/chert bedrock, glacial till, and a minor porportion of loess.

FLORA

It should be noted that there is no direct guide for subsistence use of plants by human inhabitants of this region in the distant past. However, information regarding plant use by the Nunamiut, a historic Brooks Range Eskimo group, may be judiciously applied (see Campbell, 1962 and Gubser, 1965).

The use of plants as a food item by the Nunamiut appears to have been minimal (Campbell, 1962; Gubser, 1965). Estimates of plant use as food in the Nunamiuts total yearly diet range from 1 percent to 5 percent (Hall 1961; Gubser, 1965).

Three plant communities are found in the area drained by Iteriak and Otuk Creeks. The predominant plant community is moist tundra, followed by the high bush and alpine tundra communities (Alaska Regional Profiles).

Moist tundra is characterized by cotton grass tussock meadows. These meadows also support moss and lichen growth between the tussocks, as well as grass and herb growth in frost boil areas and scattered growths of small shrubs. (Unless otherwise noted, the following descriptions and lists are taken from Alaska Regional Profiles).

MAJOR PLANTS OF THE MOIST TUNDRA COMMUNITY

Lichens and Mosses

Mosses

Spbagnum spp.

Grasses and Sedges

Sedge

Carex bigelowii

Cottongrass

Eriophorum vaginatum

Herbs

Mountain avens

Dryas spp.

Cloudberry

Rubus chamaemorus

Bistort

Polygonum bistorta

Stiff stemmed sacifrage

Saxifraga hieracifolia

Shrubs

Dwarf birch

Betula nana exilis

Willows

Salix spp.

Laborador tea

Leoum palustre

Crowberry

Empetrum nigrum

The High Bush Community occurs along the rivers and stream courses of the Arctic particularly in the mountain and foothill regions. The soils are well drained gravel, sand, and silt with a deeper than normal active layer. Constant stream course alterations and flooding cause continual change in this plant community. The High Bush community is the only one which can support moose north of the Brooks Range.

MAJOR PLANTS OF THE HIGH BUSH COMMUNITY

Lichens and Mosses

Lichens

Cladonia spp.

Mosses

Sterocaulon spp.

Sphagnum spp.

Ferns and Fern Allies

Horsetail

Equisetum arvense

Grasses and Sedges

Alpine bluegrass

Poa alpina

Grass

Agropyron macrourum

Sedge

Carex aquatilis

Herbs

Dwarf fireweed
 Monkshood
 Milkvetch
 Shooting star
 Lupine

Epliohium latifolium
Aconitum delphinifolium
Astragalus eucosmus
Dodecatheon frigidum
Lupinus arcticus

Shrubs

Alder
 Willows
 Buffloberry
 Rose

Alnus crispa
Salix spp.
Shepherdia canadensis
Rosa acicularis

Trees

Cottenwood

Populus balsamifera

The Alpine Tundra community occurs in the mountains and high foothills in well drained rocky areas. These localities exhibit fell field communities of mat-forming heather vegetation as well as scattered growth of low plants and lichens among the rock outcrops and talus slopes. The plants of this community assume a low growth form which offers some protection from their harsh, windswept habitat.

MAJOR PLANTS OF THE ALPINE TUNDRA COMMUNITYLichens and Mosses

Lichens (reindeer moss)

Cladonia spp.

Mosses

Cetraria spp.

Sphagnum spp.

Ferns and Fern Allies

Club moss
 Ferns

Lycopodium spp.

Cystopteris fragilis

Grasses and Sedges

Grasses

Festuca brachyphylla

Poa arctica

SedgesCarex spp.Herbs

Bistort
 Moss companion
 Purple mountain saxifrage
 Spider plant
 Mountain avens
 Woolly lousewort

Polygonum viviparum
Silene acaulis
Saxifraga oppositifolia
Saxifraga flagellaris
Dryas spp.
Pedicularis kanei

Shrubs

Willows
 Dwarf birch
 Crowberry
 Labrador tea
 Lapland rosebay
 Four angled heather
 Cranberry
 Blueberry
 Alpine bearberry

Salix spp.
Betula nana
Empetrum nigrum
Ledum palustre
Rhododendron lapponicum
Cassiope tetragona
Vaccinium vitis-idaea
Vaccinium uliginosum
Arctostaphylos alpina

The majority of the archeological sites in the Iteriak and Otuk Creek drainage are located in a transition zone between the Moist Tundra and High Bush plant communities or in a Moist Tundra-Alpine Tundra transition zone. In all cases, regardless of what plant community the site is located in, it is in very close proximity to a High Bush locale. The most obvious reasons for the association between archeological sites (in this region) and High Bush plant communities is access to wood and water.] ★

FAUNA

The fauna of Arctic Alaska, in both prehistoric and historic times, have provided the human inhabitants with the majority of their subsistence needs. The most important resource were the terrestrial land mammals, of which the caribou was pre-eminent. Fish and birds were also important resources though to a lesser degree than mammals. The following is a list of animals found within the area drained by Iteriak and Otuk Creeks and is primarily compiled from the field observations of the NPR-A staff and other individuals associated with the project.

MAMMALSCommon

Caribou
Shrews
Ground squirrel
Lemmings and voles
Red fox
Brown-grizzly bear
Weasels
Wolverine
Moose

Rangifer tarandus
Soricidae (family)
Spermophilus parryi
Cricetidae (family)
Vulpes vulpes
Ursus arctos
Mustelidae (family)
Gulo gulo
Alces alces

Occasional

Wolf
Arctic fox
Hoary marmot
Dall sheep

Canis lupus
Alopex lagopus
Marmota browerii
Ovis dalli

Rare

Porcupine
Lynx

Erethizon dorsatum
Lynx canadensis

BIRDSCommon

Gyr Falcon
Rough-legged hawk
Golden plover
Jaeger
Ruddy turnstone
Bar-tailed godwit
Whimbrel
Yellow wagtail
Redpoll
Snow bunting
Lapland longspur
White-crowned sparrow
Wheatear
Willow ptarmigan

Falco rusticolus
Buteo lagopus
Pluvialis dominica
Stercorarius spp.
Arenaria interpres
Limosa lapponica
Numenius phaeopus
Motacilla flava
Acanthis hornemanni
Plectrophenax nivalis
Calcarius lapponicus
Zonotrichia leucophrys
Oenanthe oenanthe
Lagopus lagopus

Occasional

Peregrine falcon
 Marsh hawk
 Snowy owl
 Short-eared owl
 Glaucous gull
 Sabine's gull
 Dunlin
 Pectoral sandpiper
 Semipalmated sandpiper
 Baird's sandpiper
 Black-bellied plover
 Canada goose
 White-fronted goose
 Pintail
 Oldsquaw
 Raven
 Rock ptarmigan
 Savana sparrow
 Tree sparrow
 Fox sparrow
 Arctic warbler

Falco peregrinus
Circus cyaneus
Nyctea scandiaca
Asio flammeus
Larus hyperboreus
Xema sabini
Erolia alpina
Erolia melanotos
Ereunetes pusillus
Erolia bairdii
Squatarola squatarola
Branta canadensis
Anser albifrons
Anas acuta
Clanqula hyemalis
Corvus corax
Laropus mutus
Passerculus iliaca
Spizella aborea
Passerella iliaca
Phylloscopus borealis

Rare

Golden eagle
 Northern shrike
 Robin

Aquila chrysaetos
Lanius excubitor
Turdus migratorius

FISH

Arctic char
 Lake trout
 Arctic grayling
 Whitefish and cisco
 Burbot
 Ninespine stickleback
 Blackfish

Salvelinus alpinus
Salvelinus namaycus
Thymallus arcticus
Coregonus spp.
Lota lota
Pungitus pungitus
Dalia pectoralis

HISTORY OF ARCHEOLOGICAL WORK IN THE REGION

In 1886, Lt. Howard, on an expedition from the upper Kobuk River to Barrow, stopped at a native village (tooloouk) approximately 18 miles (28.8 km) west northwest of the Ivtuk well site (Stoney, 1899). This was the first known white contact in the region. In 1949 archeologist Ralph Solecki accompanied several USGS teams into the NPR-A and recorded a number of archeological sites along the Etivluk (4) and Nigu (1) Rivers at or above the confluence of these two streams (the sites were actually found by USGS geologists R. L. Determan and Marvin D. Mangus and the data reported to Solecki) (Solecki, 1950). In 1954 and in 1961, W. N. Irving conducted archeological surveys on the upper Nigu River locating a major late prehistoric village site, Kinyiksukvik, approximately 22 miles (35.2 km) west southwest of the Iteriak/Otuk drainage (Irving 1962, 1964). In 1965, E. S. Hall conducted an archeological reconnaissance of the Howard Pass area, approximately 35 miles (56 km) west southwest of Iteriak Creek with few positive results (Schneider and Bowers, 1977). From 1967 to 1970, Hall carried out archeological surveys and excavations in the Ivtuk region the most notable of which was his work at Tukuto Lake some 33 miles (52.8 km) to the west (Hall, 1970, 1976). A late prehistoric village site at Betty Lake, 22 miles (35.2 km) to the west of the Ivtuk well site was also reported at this time (Hall, 1970). In 1977, a USGS/BLM archeological survey team operated briefly in the area but basically visited only sites previously known (Hall, 1977). as a result of Public Law 94-258 the National Park Service (Task Group 4) was assigned a project in which they were to assess the cultural resources within NPR-A. A number of small sites were found along the Nigu and Etivluk Rivers which was as close, 20 miles (37 km) west, as this team came to the Iteriak/Otuk Creek drainage (NPS work group 4, 1977). During the summer of 1978, a USGS/BLM team conducted an archeological survey of two proposed well site areas, one in the Upper Etivluk River region and the other in the Iteriak/Otuk drainage. The remainder of this report describes the archeological sites found during the Iteriak/Otuk portion of the survey.

ITERIAK CREEK SITES

A total of 12 archeological sites were found along the course of Iteriak Creek. Survey of the area utilized helicopter as well as ground reconnaissance and was carried out between July 5th and August 10th. During this time period all but the northern 1 1/2 miles (2.4 km) of the creek was inspected through an on-the-ground survey. The area surveyed was within 1/2 mile (0.8 km) of the stream proper. All located sites were marked by a spike and tag -- the tag engraved with the date of discovery, field designation number and the state designation number.

Site designation (AHRS) IKR-108

Site designation (Field) KR-78-13

Location NW 1/4 Sec. 15, T. 34 N., R. 31 E., Killik River, Kateel River
Meridian

Elevation 2600 feet (780 meters)

The site is located on an extensive glacial feature which appears to be a moraine or large kame terrace. This ice contact feature is approximately 165 feet (50 meters) west of Iteriak Creek, its eastern side forming an elevated bench rising 15 feet (4.5 meters) above the stream. An excellent view to the north (down valley) is available from the site while the view to the west, south, and east are somewhat restricted due to the close proximity of the mountains.

The surface of the site is 80 per cent exposed glacial till. Soil cover is for the most part non-existent though there are clumpy growths of grass and tundra scattered about. The topography of the site shows a network of extremely large frost cracks (ice wedges may be active) and some slumping along the eastern edge. The archeological site appears to have suffered some disturbance as a result of the above mentioned cryoturbation.

Cultural features at the site consist of large tent rings and one associated cache pit. The tent rings are aligned south to north along the eastern edge of the bench. The tent rings are approximately 60 feet (18 meters) apart; two are circular in shape and one is sub-rectangular. The tent rings are large, roughly 10-12 feet (3 meters) in diameter and have several piles of large rocks (2-4 rocks to a pile) situated a few feet outside the ring diameter. These rock piles probably served as guy line anchors for the tents. Several bone and willow fragments were found near the tent rings as well as a .44 W.C.F./W.R.A. cartridge case and a single chert flake. The cartridge case appeared to have a copper primer which would indicate the shell had been loaded with black powder. A black powder load would indicate an age of AD 1870-1930. The condition of the cartridge case and the fact it is associated with tent rings probably indicates a site occupation date of AD 1880-1910. The site appears to have been occupied only once (assuming the three tent rings are co-eval) and probably represents a short duration campsite inhabited by Nunamiut or Kobuk River Eskimos.

Site designation (AHRS) KIR-109

Site designation (Field) KR-78-14

Location SE 1/4 Sec. 22, T. 12 S., R. 17 W., Killik River, Umiat Meridian
Elevation 2400 feet (720 meters)

This site is located in a shallow saddle on a high outcrop of shale-like material about 1/4 mile east of Iteriak Creek. Local relief places the site approximately 250 feet (75 meters) above the creek and offers an excellent view of the valley northeast-northwest.

The surface of the site is a decomposed and frost fractured shale-like material which supports patchy growths of grasses and moss. About 20 per cent of the surface is vegetated.

All of the cultural material appeared to have come from a sik sik (ground squirrel) burrow. About 150 waste flakes and two large biface fragments were observed in the squirrel excavated back dirt pile. The artifacts and waste flakes were of the same lithic material; a black grainy chert which is common in the area. Other nearby sik sik burrows were examined and they yielded no additional cultural material. For this reason we assume the site to be quite small and typical of regional hill top game lookout/chipping stations. No cultural features were observed and may indicate a very short period of occupation or use.

The two biface fragments are similar to examples described by Anderson (1968 and Campbell (1959 and 1962) as belonging to the Portage and Kayuk Complexes respectively and are commonly found in sites in the Iteriak/Otuk area. This site may date from Northern Archaic times though the artifact sample upon which this assignment is based is so small as to be meaningless.

Site designation (AHRs) KIR-102

MESA SITE

Site designation (Field) KR-78-7

Location SE 1/4 Sec. 11, T. 12 S., R. 17 W., Killik River, Umiat Meridian

Elevation 2400 feet (720 meters)

This site is located on a large mesa-like formation approximately 1000 feet (300 meters) east of Iteriak Creek. The mesa stands more than 200 feet (60 meters) above the surrounding landscape and offers an excellent view of the surrounding country in all directions. There are sheer cliffs at the western end of the mesa while the rest of the feature is ringed by steep though scaleable talus slopes. The surface of the site is broken into several distinct areas by bedrock outcrops; a broad gently sloping southwestern area, a central saddle, and an eastern promontory. The total site area is approximately 5 acres while the local relief on the mesa top is 71 ft (19 m). Approximately 80% of the surface is thinly to moderately vegetated (grasses and tundra mat) with accompanying soil depth varying from 10 cm in the southwest to more than 50 cm. in the saddle.

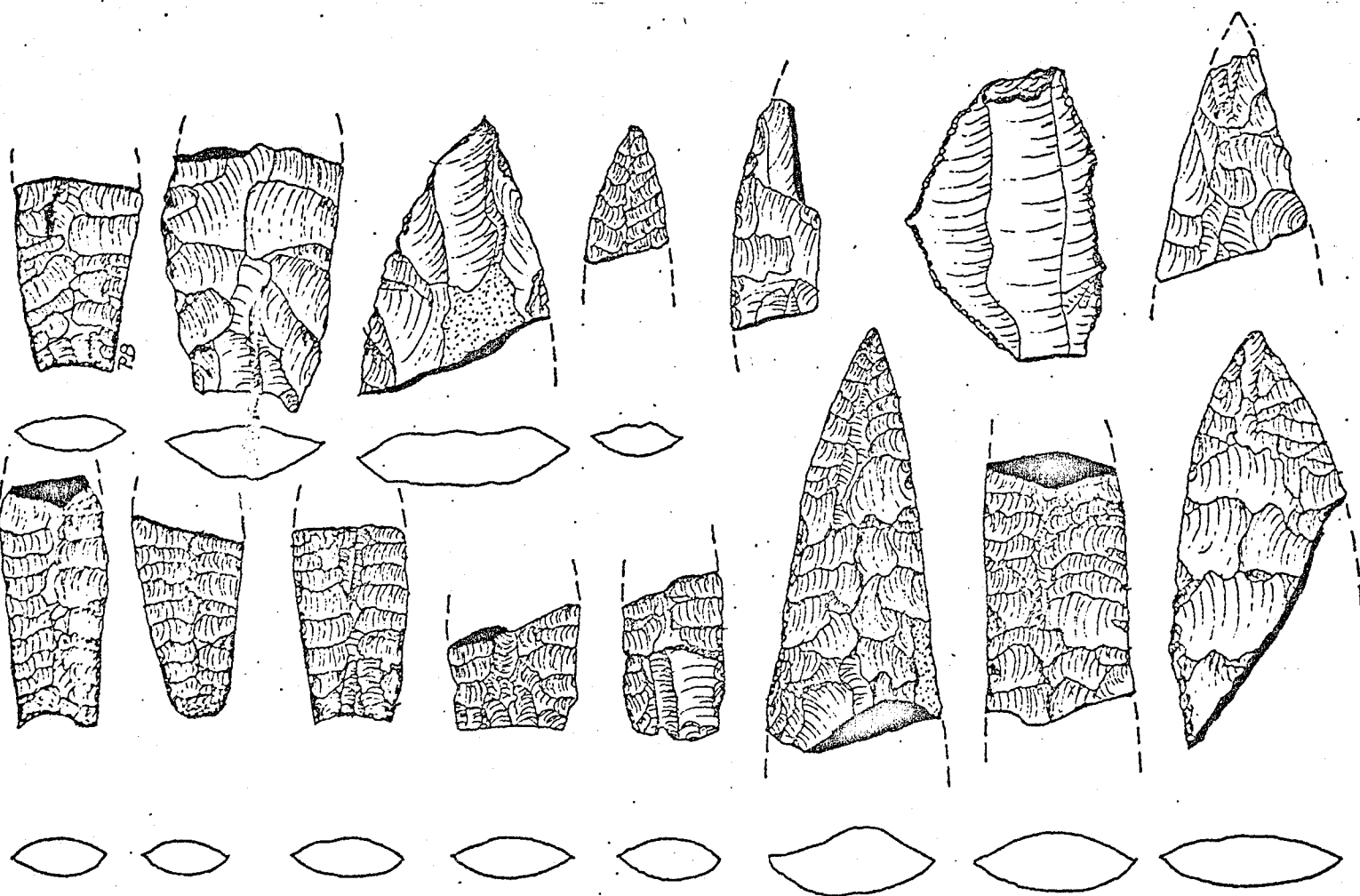
A total of twenty-four artifacts were recovered from the surface of the site in areas where the vegetation was somewhat sparse. (These artifacts were collected as it appeared at the time that the mesa might be used as a survey point for the well site Herc strip. Understandably "arrow heads" lying on the surface offer a strong "pick me up" temptation.) Three major artifact concentration and associated flake scatter areas were recognized as a result of the surface survey (no test excavations were initiated). A topographic map was made of the mesa top and the location of the artifacts and general limits of flake concentrations were noted. The great majority of the artifacts (15 of 24) were recovered from the gently sloping southwestern section of the site where three artifact concentration areas are located. Other areas of the site are expected to be equally rich in cultural material but are more heavily vegetated than the southwestern section and therefore not as assessable by surface survey (see map).

Of the twenty-four artifacts recovered, 15 are bifaces and nine are retouched flakes. Nine of the bifaces are projectile points; one complete, 5 bases, 2 medial segments and one tip. All are lanceolate in shape, three having concave bases and three having more or less convex bases. The single complete projectile point is 5.2 cm long, 2.2 cm wide, 0.6 cm thick and is slightly smaller than the other specimens. All of the artifacts in the projectile point class appear to have been finished or nearly finished tools at the time of breakage. These artifacts are very similar to those recovered by Anderson (1968) at Onion Portage in Band 5 levels 2 and 3. Anderson places these artifacts in the Northern Archaic tradition and specifically the Portage Complex to which he assigns a date 2600-2400 B.C. They are also reminiscent of forms described by Campbell (1959 and 1962) for the Kayuk Complex, and by Alexander (1974) for the Bedwell Complex.

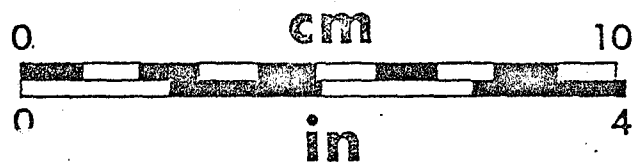
Associated with the lanceolate points are 6 longer and cruder biface fragments which may be either knives or pre-forms.

The site appears to be comprised of a single cultural component. This factor, as well as the undisturbed nature of the site and the possibility of recovering some dateable organic material, render it a potentially important site.

The fact that most of the projectile points recovered were finished bases may indicate the mesa top was used as a campsite as well as a game lookout.



KIR • 102



Site designation (AHRs) KIR-101

Site designation (Field) KR-78-14

Location NE 1/4 Sec. 2, T. 12 S., R. 17 W., Killik River, Umiat Meridian

Elevation 2000 ft. (600 meters)

This site is located on a gently sloping, weathered, chert/limestone bedrock outcrop 40 meters east of Iteriak Creek. Local relief places the site approximately 150 feet. (45 meters) above the creek and offers an excellent view of the valley to the north. The surface of the site is decomposed bedrock mantled by very little soil or vegetation.

The site area is about 400 square meters and was determined by surface indications only. Only waste flakes were observed at the site, all of grainy black chert. No cultural features were observed which may indicate a very short period of occupation or use. The site is typical of small chipping/lookout sites in the region.

Site designation (AHRs) KIR-113

Site Designation (Field) KR-78-18

Location SE 1/4 Sec. 35, T. 11 S., R. 17 W., Killik River, Umiat Meridian

Elevation 1950 feet (585 meters)

This site is located on a weathered limestone/chert bluff top fifty feet (15 meters) above and 30 meters west of Iteriak Creek. The site offers a good view of the valley to the south, west and north though rising topography reduces the eastward view to approximately one mile. The site is 300 meters south of, "proposed alternate borrow site #5", (Lisburne test well) and was at one time under consideration as a borrow site. The soil is quite thin and as a result the vegetation at the site is quite sparse consisting of scattered patches of grasses, moss, and lichens; some tundra mat is present in depressions.

Cultural material consisting of hundreds of flakes is scattered over the entire bluff tip; an area 60 meters square. There are four major flake concentrations though no formal or diagnostic artifacts were noted. Most of the flakes are of local bedrock material and their morphology indicates that chert quarrying may have been one of the site functions. Excavation of selected areas of this site may yield some formal artifacts as it is a bit odd to find so many flakes and no formal tools. As a result little more can be said concerning cultural components and/or their time duration. The morphology of the site is typical of most sites in the valley and on this basis it could be very tenuously assigned to the Northern Archaic time period.

Site designation (AHRS) KIR-100

Site designation (Field) KR-78-5

Location NE 1/4 Sec. 35, T. 11 S., R. 17 W., Killik River, Umiat Meridian

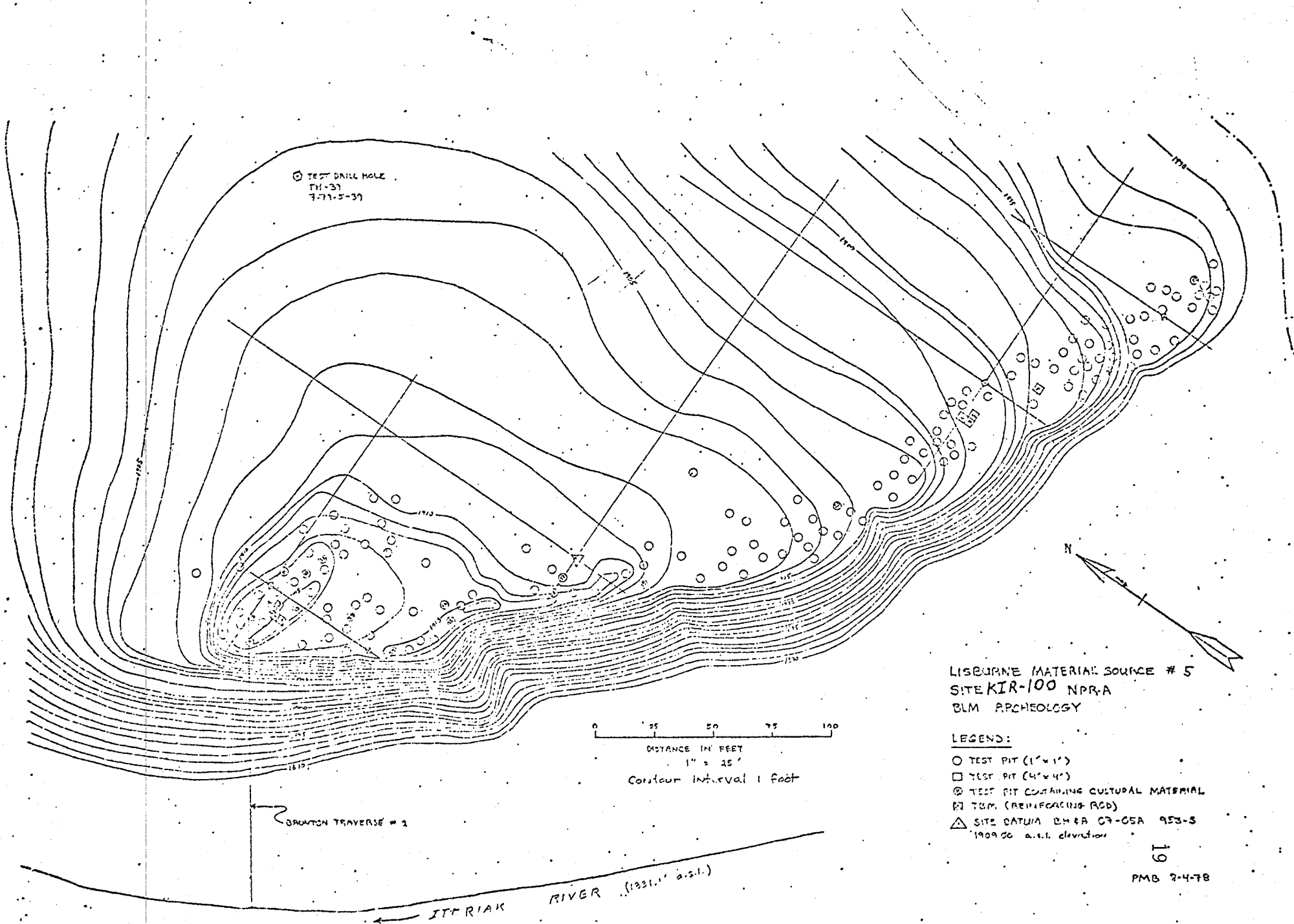
Elevation 1915 feet (575 meters)

This site is located on a bluff top 30 meters east of Iteriak Creek. At its maximum elevation the site lies 84 feet. (25 meters) above the creek and offers an excellent view of the valley southwest-north. This site is located on "alternate borrow site #5" (Lisburne test well) the use of which was denied by BLM/USGS archeologists due to the presence of cultural material.

The gently sloping surface of the site is approximately 80% vegetated, only the extreme bluff edge lacking plant cover. Vegetation is basically typical tundra mat interspersed with occasional clumps of grass and some dwarf birch and willow. Soil thickness ranges from 0 cm (limestone/chert bedrock) to a poorly defined, cobbly, "arctic brown" reaching 40 cm. in depth. Sod thickness ranged up to 8 cm. Only the well drained portion of the bluff top produced cultural material. This area constituted a band about 15 feet (4.5 meters) wide and over 400 feet (119 meters) long running along the bluff edge and small promontory on the western end of the bluff.

Fifteen man days were put in at the site to determine its size, complexity, and to map it (see map). Over 150 one foot square non-systematic, shovel test pits were excavated as well as eight 4 foot by 4 foot controlled grid squares in an effort to assess the site without entering into a full scale excavation program. Over 1000 waste flakes and several crude biface fragments were recovered as well as a rotated (180°) blade core (percussion) and a well made bifacial knife fragment. The core is similar to cores recovered from Lisburne borrow #1 (KIR-096), two miles to the north, and from the Gallagher Flint Station (Dixon, 1975).

The site is similar (though much smaller) in all ways to KIR-096 and as a result considered significant enough to deny its use as a borrow site. The site may date from Paleo-Arctic times and is, at the least, Northern Archaic in age. No evidence of more recent occupations of Eskimo continuum age was found as was the case at KIR-096. This site appears to have served multiple roles as a quarry site/workshop, campsite, and game lookout station.



LISBURN MATERIAL SOURCE # 5
SITE KIR-100 NPR-A
BLM ARCHEOLOGY

LEGEND:

- TEST PIT (1' x 1')
- TEST PIT (4' x 4')
- ⊗ TEST PIT CONTAINING CULTURAL MATERIAL
- ⊠ TUM. (REINFORCING ROD)
- △ SITE DATUM BM 4A 07-05A 953-5
1909.00 a.s.l. elevation

Site designation (AHRS) KIR-099

Site designation (Field) KR-78-4

Location NE 1/4 Sec. 26, T. 11 S., R. 17 W., Killik River, Umiat Meridian

Elevation 1860 feet (559 meters)

This site is located on a bluff top which projects southward into the Iteriak Creek flood plain. The bluff has steep sides to the south and east and is elevated 30 feet (9 meters) above the creek. The site offers a good view of the valley south southwest through northwest while rising terrain restricts the view from northwest through southeast. The surface is 90% vegetated with a relatively thick tundra mat though there are areas of exposed and weathered limestone/chert bedrock along the lip of the bluff and some scattered, small patches of exposed gravel. A surface survey of this site revealed two concentrations of flakes along the crest of the bluff, one near the midpoint (consisting of less than 5 flakes) and another larger concentration near the eastern edge. A large, crude chert flake core was found near the smaller of the two flake concentrations. No diagnostic artifacts were recovered so cultural assignment is difficult. However, the site appears typical of small, little used chipping/game lookout stations common in the area.

Site designation (AHRS) KIR-098

Site designation (Field) KR-78-3

Location SE 1/4 Sec. 23, T. 11 S., R. 17 W., Killik River, Umiat Meridian

Elevation 1850 feet (556 meters)

This site is located on top of a low bluff about 30 feet (9 meters) above and 30 meters east of Iteriak Creek. This is one of the lowest bluffs of the bluff line which borders the east side of Iteriak Creek in this area and consequently offers a good view only to the southwest. As is typical of most sites along the creek, only about 25% of the surface is vegetated, the remainder being exposed, weathered limestone/chert bedrock. In the vegetated areas soil depth ranges to 8 cm.

A surface survey of this site revealed a large bifacially worked flake core and an associated scatter of flakes (less than a dozen) all of the same lithic material. More cultural material may be present though certainly not enough to classify this site as anything but a little used game lookout/chipping station.

Site designation (AHRS) KIR-097

Site designation (Field) KR-78-2

Location NE 1/4 Sec. 23, T. 11 S., R. 17 W., Killik River, Umiat Meridian
Elevation 1850 feet (556 meters)

This site is located on a low bluff which is somewhat recessed to the east when compared with the rest of the Iteriak Creek Bluff line. As a result of its location the view is somewhat obscured except southwest through northwest. As typical of bluff top sites in the area, only about 15% of the surface is vegetated and what thin soil is present was 70% decomposed/fragmented limestone and chert. Some areas of relatively deeper organic soil were found surrounding sik sik (ground squirrel) burrows.

This site was located on "proposed borrow site #2 (Lisburne test well) and therefore required test excavations so as to be able to determine possible mitigation procedures. The original surface survey of the site located several small flake scatters near the lip of the bluff. The largest of these concentrations was gridded into four 4 foot by 4 foot squares and excavated. Cultural material extended to a depth of 4-5 cm and consisted entirely of waste flakes. Less than 100 flakes were recovered from this 64 foot square area, 90% coming from the portion of the grid. Additional surface survey revealed a small stone ring 19 inches in diameter 254 east of the original find. Sik sik burrow back dirt approximately 10 feet from the ring contained several chert flakes. The area around the burrow was gridded into four 4 foot by 4 foot squares and excavated; cultural material was recovered to a depth of 10 cm. a total of 1002 flakes and 4 crude biface fragments were recovered from the gridded area. The stone ring, which may have been a hearth, though no charcoal was present, was also excavated and yielded no cultural material.

On the basis of the surface surveys and test excavations it was determined that little significant information could be recovered from this site and it was abandoned. Based on the single feature present at the site and the type of material recovered it is felt that at least the eastern portion of the site can be attributed to occupation by late prehistoric/historic Eskimos and was probably used as a brief camp/game lookout/quarrying station.

Site Designation (AHRS) KIR-096

Site designation (Field) KR-78-1

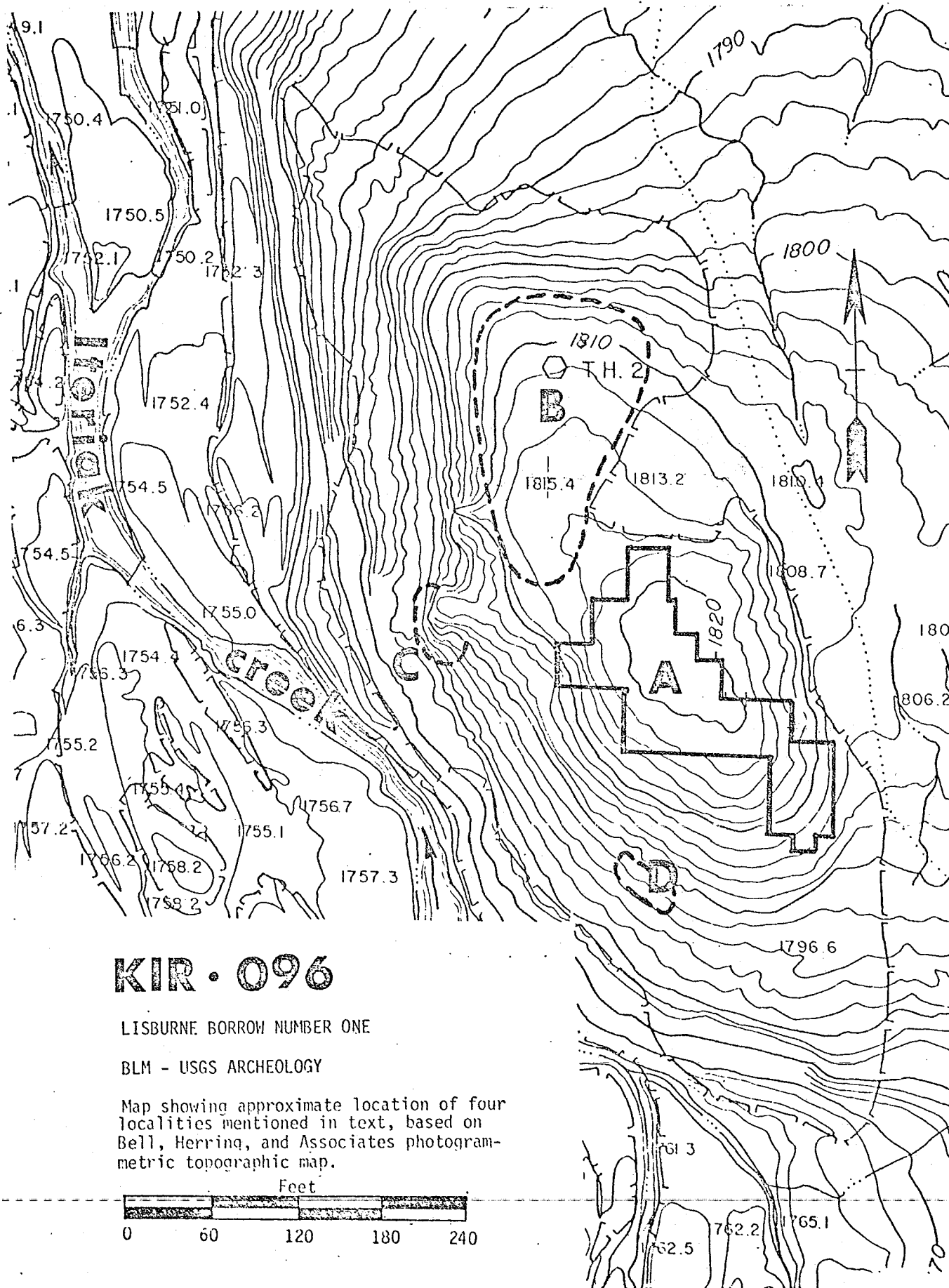
Location SE 1/4 Sec. 14, T. 11 S., R. 17 W., Killik River, Umiat Meridian

Elevation 1820 feet (547 meters)

This site is located on the most prominent portion of the Iteriak Creek bluffs and commands an excellent view of the valley in all direction. Iteriak Creek flows along the base of the bluff 65 feet (19 meters) below the crest. Approximately 50% of the site area is vegetated, the cover ranging from typical tundra mat to patchy growths of grasses, sedges, and mosses. Dwarf birch and willow are also present. Soils may range beyond 25 cm in depth though only in specific areas. The remainder of the surface is limestone/chert bedrock and traces of glacial till. Cherts have weathered out of the limestone matrix and this readily available raw material may have been a major reason for aboriginal occupation of the site. Large bands of caribou passed by the site during the summer and if this was the case in the past is another major reason for site occupation.

The site encompasses an area of roughly 75,000 square feet which has been divided into four localities. The most important and productive of these areas is locality "A" which encompasses an area of 30,000 square feet and was almost completely vegetated. Over 4000 square feet of this locality was excavated, yielding the bulk of the cultural material recovered from the site. Locality "B" which was 90 per cent unvegetated was gridded and surface collected. Localities "C" and "D" were surface collected and test excavated and yielded less than 1 per cent of the cultural material recovered from the site. Over 590 artifacts (excluding purposeful and use retouched flakes) were recovered from the site along with 27,000 plus waste and utilized flakes. An additional 1000 square feet plus of the site has yet to be excavated.

Based upon typology, the artifacts recovered from the site appear to represent three basic periods of occupation: American Paleo-Arctic, Northern Archaic, and Eskimo Continuum. A single feature at the north-western end of the site (a fallen carin or enuglak may indicate a brief occupation or occasional use by late prehistoric/ historic Eskimos. The American Paleo-Arctic period of habitation is represented by a series of large percussion flaked blade cores similar to specimens from the Akmak (Anderson, 1968) Driftwood (Humphery, 1970) and Gallagher Flint Station (Dixon, 1975) assemblages as well as a fluted point reminiscent of finds along the Utukok River (Humphrey, 1966) and the Putu Site (Alexander, 1974). Northern Archaic forms include a shallow-notched, basically thined point or knife with grinding in the notches, large elongate bifaces of thick cross-section, large semi-lunar bifaces, small elongate



bifaces, and small semi-lunar bifaces, some of which are similar to specimens of the Portage Complex (Band 5 levels 2 and 3) at Onion Portage (Anderson, 1968). Eskimo Continuum forms are represented by small inset blades, obsidian microblades (?), a discoidal scraper, a small drill or flake knife and a shaved burin.

Prior to the discovery of the archeological site the bluff had been designated as the prime borrow site (Borrow site #1, Lisburne test well) for material for well pad and Herc strip construction. Upon completion of the test excavations at the site the majority of the bluff was denied for use as a material source. Although the site is still within a possible area of surface disturbance activity, a subsequent change in engineering plans has now removed this site from the active borrow locale category. Excavations at the site will be continued during the summer of 1979.

Site designation (AHRS) KIR-115

Site Designation (Field) KR-78-20

Location SW 1/4, Sec. 11, T. 11 S., R. 17 W., Killik River, Umiat Meridian
Elevation 1850 feet (558 meters)

This site is located on the west side of Iteriak Creek on a bluff top approximately 75 feet (21 meters) above the creek. The east face of the bluff is a sheer drop to the creek. An excellent view of the valley is offered in all directions. The surface of the site is heavily vegetated with a mixture of tundra, grasses, sedges, mosses, and dwarf birch and willow. Soil type and composition is typical of the area though it achieves a greater depth, 30 cm. plus than at most of the other sites.

A surface survey of the area turned up a single chert flake. However, very little of the surface area was exposed which probably accounts for this meager amount of observed cultural material as the locale is an ideal game lookout/camp site. This area was not to be impacted in any way by oil exploration activities so no sub-surface testing was initiated. An active Gyrfalcon nest is located on the bluff face approximately 12 feet (4 meters) below the rim.

Site designation (AHRS) KIR-110
Site designation (Field) KR-78-17
Location NE 1/4 Sec. 22, T. 10 S., R. 17 W., Killik River, Umiat Meridian
Elevation 2000 feet (600 meters)

This site is located in a group of hills 1/4 mile west of Iteriak Creek and one mile above its confluence with Otuk Creek. The site area is a gently sloping pocket, somewhat sheltered by surrounding low knolls which obstruct the view in all direction but east. The surface of the site is approximately 50 per cent vegetated by patchy growth of thin grass and moss. The soil is quite gravelly and ranges to more than 30 cm. in depth.

A surface survey of the area disclosed a thin scattering of chert flakes over a large area (approximately 50 by 100 meters) with other isolated flakes found in the surrounding five acres. A single biface fragment was associated with the flake concentration. This area was not to be impacted in any way by oil exploration activities, as a result no sub-surface testing program was initiated. No cultural assessment can be made from the evidence located at the site, except to mention that it would make a good camping location.

OTUK CREEK SITES

A total of 11 archeological sites were located along the course of Otuk Creek. A surface survey of the area within 1/4 mile of the creek from its head waters northward to within five miles of its confluence with Iteriak Creek was carried out between mid July and early August. The basic survey was pedestrian though helicopters were employed for transportation to the survey area. No excavations of any type were carried out at these sites as none were in danger of any primary impact as a result of the oil exploration program. All located sites were marked by a spike and tag; the tag bearing the date of discovery, field designation number, and the state (AHRS) designation number. No artifacts or flakes were collected from any of the Otuk Creek sites.

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Site designation (AHRS) KIR-111

Site designation (Field) KR-78-16

Location SW 1/4 Sec. 2, T. 34 N., R. 13 E., Killik River, Kateel River
Meridian

Elevation 2600 feet (780 meters)

This site is located in a group of glaciated (till mantled) hill-like bedrock features near the head waters of Otuk Creek. The site is approximately 200 feet (60 meters) above and 1/2 mile west of the creek. This location affords an excellent view of the entire valley and on clear days the Colville River, 40 miles to the north, can be seen. The surface is almost devoid of any vegetative cover and is littered with angular chunks of limestone/chert bedrock and glacial till; soil is very coarse and thin.

The site consists of a large stone tent ring approximately 4 meters in diameter and an associated fallen inuqsuq or carin. The number and size of the carin/inuqsuq stones indicate it may have stood up to 1 meter in height. A large number of chert flakes were present around and within the stone ring. There may be a smaller stone ring, perhaps a hearth, in the center of the large ring. The entrance into the tent ring (if it is an entrance) appears to be spiral and faces southeast. Approximately 50 meters to the north and slightly down slope is a smaller tent(?) ring slightly more than 1 meter in diameter. No other cultural material was associated with this feature. No diagnostic artifacts were noted, however, tent rings in this region usually indicate use of the locality by late prehistoric/historic Eskimos.

Site designation (AHRS) KIR-116

Site designation (Field) KR-78-21

Location NE 1/4, Sec. 12, T. 34 N., R. 13 E., Killik River, Kateel River
Meridian

Elevation 2300 feet (690 meters)

This site is located in a low saddle between two till mantled bedrock knobs 1/2 mile west of Otuk Creek. The site affords a good view to the north and south. The surface of the site is approximately 50 per cent vegetated, the remainder being a bedrock gravel mixed with a thin organic soil.

Cultural material at the site consists of a slightly worked cortex slab from an obsidian cobble. The fact that obsidian is extremely rare in this area makes this case worthy of note.

Site designation (AHRS) KIR-117
Site designation (Field) KR-78-22
Location NE 1/4, Sec. 7, T. 34 N., R. 14 E., Killik River, Kateel River
Meridian
Elevation 2600 feet (780 meters)

This site is located on a sheltered bench in a group of till mantled bedrock knobs 1/2 mile east of Otuk Creek. Because of its secluded location this site offers only a restricted view of the surrounding country. The surface of the site supports little vegetation and is for the most part covered with weathered bedrock rubble.

Cultural material consists of a scatter of black chert flakes covering an area of approximately 2 square meters and an associated biface fragment. The biface fragment is typical of Norton/Ipiutak flake knives and on that basis the site may be assigned to that time period.

Site designation (AHRS) KIR-112
Site designation (Field) KR-78-17
Location SW 1/4 Sec. 19, T. 12 S., R. 16 W., Killik River, Umiat
Meridian
Elevation 2250 feet (675 meters)

This site is located on a low, flat, kame 1/4 mile west of Otuk Creek. Site relief is slight and as a result, the view is somewhat restricted. The surface cover is 70 per cent vegetation and 30 per cent exposed glacial till.

The site is located on the extreme eastern edge of this feature and consists of a 6 square meter flake scatter and a small flake knife or scraper. Lithic material is all the same, black chert, so the site may represent a single occupation.

The knife/scraper is of a type commonly found in Norton/Ipiutok sites and for this reason the site may be considered to be of that time period.

Site designation (AHRS) KIR-118
 Site designation (Field) KR-78-23
 Location NW 1/4 Sec. 19, T. 12 S., R. 16 W., Killik River, Umiat
 Meridian
 Elevation 2180 feet (659 meters)

This site is much the same as the preceeding one (KIR-112) though the glacial feature (Kame) upon which it is located is less extensive. The site itself is smaller too, consisting of approximately 10 flakes in a 3 square meter area. No diagnostic artifacts were present and no cultural assessment can be made.

Site designation (AHRS) KIR-103
 Site Designation (Field) KR-78-8
 Location SE 1/4 Sec. 6, T. 12 S., R. 16 W., Killik River, Umiat
 Meridian
 Elevation 2200 feet (660 meters)

This site is located on the western edge of a large knoll of limestone/chert bedrock, 300 meters east of the creek. The knoll offers a good view of the Otuk valley in all directions. The site supports very patchy and sparce vegetation the majority of the site being exposed limestone/chert bedrock and some glacial till.

Cultural material at the site consists of a 10 square meter flake scatter and two associated crude biface fragments. The locale is ideal for a game lookout/ chipping station type of site though it appears the locale was not often used.

Site designation (AHRS) KIR-104
 Site designation (Field) KR-78-9
 Location NE 1/4 Sec. 6, T. 12 S., R. 16 W., Killik River, Umiat
 Meridian
 Elevation 1950 feet (585 meters)

This site is located on a high bluff with a sheer western face which drops 80 feet (23 meters) into Otuk Creek. An excellent view of the southern Otuk valley can be had from the site; the view to the north is obstructed by the Iivotuk Hills. Sixty per cent of the site surface supports vegetation; for the most part a typical tundra mat. The remainder of the site is exposed limestone/chert bedrock and glacial till.

A surface survey of exposed areas of the bluff top indicated the presence of a fairly extensive site. Numerous flakes were found scattered over a

one acre area representing several varieties of chert. One biface fragment was located and no cultural features were noted. The site appears, from its size, to have been used often, possibly as a quarry/campsite. The lack of diagnostic artifacts precludes any cultural or temporal assignation.

Site designation (AHRs) KIR-105

Site designation (Field) KR-78-10

Location SW 1/4 Sec. 30, T. 11 S., R. 16 W., Killik River, Umiat
Meridian

Elevation 1900 feet (571 meters)

This site is located on a complex of three bedrock outcrops. The site area is almost completely devoid of vegetation. The view to the north is restricted by the Iivotuk Hills but is good to the south.

All three of these closely associated outcrops hosted flake scatters though no formal artifacts were noted. These locales would have served well as chipping station/game lookouts.

Site designation (AHRs) KIR-106

Site designation (Field) KR-78-11

Location SE 1/4 Sec. 19, T. 11 S., R. 16 W., Killik River, Umiat
Meridian

Elevation 1850 feet (557 meters)

This site is very similar to the preceding one (KIR-105) though it is much smaller, containing less than 10 waste flakes.

Site designation (AHRs) KIR-114

Site designation (Field) KR-78-19

Location NW 1/4 Sec. 29, T. 11 S., R. 16 W., Killik River, Umiat
Meridian

Elevation 1800 feet (543 meters)

This site is located on a gravel/bedrock outcrop on the west bank of an unnamed tributary of Otuk Creek. The site lies off the west face of the Iivotuk Hills 1/2 mile east of Otuk Creek. The view from the site is very restricted due to its low setting among the hills. The surface of the site is vegetated only on the extreme upper slope, the remainder being bare gravel and some thin soil.

A surface survey disclosed chert flakes scattered over a wide area (30 square meters) on the sloping face of the outcrop. Associated with these flakes were two core tablets (each of different material) which were roughly oval in shape and appear to have come from relatively large, well made cores. These core tablets are similar to several recovered from KIR-096, approximately 3 miles to the northwest. The fact that core tablets are present may indicate a minimum age of ca. 2000 BP for the site. The fact that material is strung out down the slope suggests that the main body of the site is located in the vegetated upper portion of the out crop.

Site designation (AHRS) KIR-107

Site designation (Field) KR-78-12

Location SW 1/4 Sec. 8, T. 11 S., R. 16 W., Killik River. Umat
Meridian

Elevation 1800 feet (543 meters)

This site is located atop the last (furthest north) prominent bluff on Otuk Creek. The bluff has a shear face which drops 120 feet directly into Otuk Creek. There is a saddle running along an east-west axis between two bed rock promontories on the bluff top and it is here the site is located. The saddle is flat floored and sheltered yet a 10 second walk to the saddle lip yields a view of the entire valley. About 60-70 percent of the site surface is vegetated, the unvegetated portion appears the result of wind deflation. The soil is gravelly though relatively deep (30 cm plus in some locales) and composed of a high percentage of fine material; probably the result of aeolian deposition.

The site consists of an area of approximately 2 acres, the surface (exposed) of which is lettered with an estimated 10,000 chert flakes. The flakes represent a variety of types of chert, most of which appears to be local. No artifacts were located, despite the large number of flakes present. The site locale is an excellent game lookout/camp site and appears to have been used extensively. Some chert quarrying may also have taken place there. Due to the lack of diagnostic artifacts, no further cultural assessment can be made at this time.

Site designation (AHRs) KIR-119
 Site designation (Field) KR-78-24
 Location NW 1/4 Sec. 22, T. 9 S., R. 17 W., Killik River, Umiat
 Meridian
 Elevation 1400 feet (420 meters)

While this site is on the East Fork of the Etivluk River it can be considered within the Otuk/Iteriak Creek drainage. The site is located on the base of an isolated hill on the south shore of an unnamed lake three miles above the confluence of the East Fork and Iteriak Creek.

A very sparse tundra mat covers the lower portion of the hill interspersed with many areas of exposed gravel. Very little time was spent at this site and only a very cursory surface survey was done. A single chert flake was located on the surface though it is believed further survey would locate a concentrated site area.

SUMMARY

All of the 24 sites located in the Iteriak/Otuk drainage were located on some type of prominent land form such as glacial features, bluffs, outcrops or hills. These features all possess common attributes which make them attractive for a variety of uses by aboriginal groups. These attributes are; sufficient relief to provide a good view of the surrounding country (relief may also be considered in terms of being less insect infested than lower areas), well drained, dry ground surface, available raw lithic material, and close proximity to a potable water source (streams also produce stands of willow which provide wood for fuel and building materials). Both Iteriak and Otuk Creeks are flanked along most of their length by bluffs and/or hills. Stream courses which are bordered by bluffs were often used as travel routes by aboriginal people, especially if they were assessable to passes through the mountains. The high density of sites along Iteriak and Otuk Creeks may be reflecting such use as virtually every promontory along these stream courses show some evidence of past human use.

Caribou were very plentiful in the region during the summer of 1978 with numerous large groups of several thousand animals passing through. If this were the case in the past, the promontory sites would be ideal for spotting and ambushing caribou and may be another reason for the high site density along the creeks.

Most (20) of the sites appear to have been only briefly or sporadically used as chipping stations/camp sites/game lookouts and as a result, little can be said about them. It is interesting to note that all the

tent ring sites occur at the valley head where the streams leave the mountains. There may be some late prehistoric/historic Eskimo components at two other sites KIR-096 and KIR-097 but as far as pure tent ring sites go, they appear to be relegated to the mountainous southern end of the valleys.

Two small sites, KIR-117 and KIR-112, appear to represent Norton/Ipiutak Culture. There is also an Eskimo Continuum component at KIR-096 but other than this the Eskimo Continuum is rather poorly represented.

The remainder of the sites which are represented by some type of formal artifacts appear to fall into the Northern Archaic or earlier time periods. Four sites fall into this category: KIR-109, KIR-102, KIR-100, and KIR-096. The first three show affinities with the Northern Archaic (specifically Portage Complex artifacts) time period only, while the fourth (KIR-096) appears to have examples of earlier components, including Akmak, Putu, and Gallagher.

Only five of the sites can be considered large (at least for this region of Alaska) and only two, KIR-096 and KIR-102, can be considered worthy of the expenditures of time, effort, and money necessary to conduct an excavation program. KIR-096 has been more than fifty percent excavated and excavations will continue at the site during the summer of 1979. KIR-102 has not been excavated but is definitely worthy of a full scale excavation program. Some limited testing of this site may be done during the summer of 1979 with an eye toward obtaining Carbon 14 samples.

Conclusions

The 1978 survey of the Iteriak/Otuk drainage yielded two major bits of information.

1. The site density for such a minor drainage system was quite surprising. This may be the result of a combination of factors or by the presence of only one or two extremely important factors. However, more comparative work will have to be done in the area before any trends can be determined.
2. The number of sites that fall into the Northern Archaic time period seems high when compared with the other time periods represented. This may indicate that either the area was particularly well suited to the life style of Northern Archaic Peoples, or that mid-holocene climatic conditions were more favorable to human habitation.

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PRELIMINARY INVESTIGATIONS OF THE LISBURNE SITE (KIR 096),
Southeastern NPR-A Alaska

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Abstract

As part of a joint USGS/BLM cultural resource management program in NPR-A, excavations were conducted during 1978 at the Lisburne borrow site #1, located near a proposed USGS exploratory well site in the Iteriak/Otuk valley. The USGS is managing a petroleum exploration program through its operator, Husky Oil, and BLM is responsible for surface protection in discharging Interior's mandate (PL 94-258) to explore the petroleum potential of the Reserve. KIR-096 is located 30 miles northeast of Howard Pass, in the northern foothills (southern section) of the Brooks Range. The Lisburne site is a shallow, large quarry/lookout site situated on a prominent river terrace overlooking Iteriak Creek. Four major activity localities were designated. Few organics were preserved at the site. With the exception of one cache pit, no hearths, structures or other features were encountered. Preliminary analysis indicates that 97% (n=27,000) of the lithics at the site are unmodified quarry debitage. Artifacts recovered from the site bear typological similarities with the American Paleo Arctic, Northern Archaic and Arctic Small Tool traditions (ASTt) of Northwestern Alaska. Included in the former category are various large percussion flaked blade cores, wedge shaped cores, core tablets, and flake burins. A fluted point similar to Putu forms was recovered. Northern Archaic forms include shallow notched, basally thinned points, semi lunar bifaces, and other biface forms. ASTt related materials include small end blades, drills, and scrapers. This preliminary report discusses the data recovered and offers some tentative interpretations.

INTRODUCTION ¹

Lisburne Borrow #1 (State of Alaska Heritage Resource File #KIR-096) is located in the southern foothills province of the North Slope (68°28'53"N, 155°48'29"W, Umiat Meridian, Killik River Quadrangle, Elevation 1826.83' ASL). The site is located on a prominent bedrock erosional terrace or bluff along the east side of Iteriak Creek (approximately 50 miles northeast of Howard Pass) which commands an excellent view of the valley in all directions (see map, fig. 1). The bluff on which the site is located is composed of limestone/chert bedrock. The chert weathers out of the limestone matrix and litters the surface of the non-vegetated areas of the site. Some glacial till is also present on the surface of the site. Two of the major resources present in the area, caribou and chert outcrops, undoubtedly were reasons for the prehistoric utilization of the site. Based upon data gathered during the 1978 field season, the site appears to have been occupied at least three separate times over the last 10,000 years. The site has served as a chert quarry, a game lookout/hunting station, and a chipping/tool manufacturing station. (See accompanying report by M. L. Kunz for more complete description of environmental setting.)

The site was discovered on 5 July 1978 during an archeological survey in the vicinity of the proposed Lisburne well site in the southeast corner of NPR-A (see fig. 1, site #KIR-096). During July and August of 1978, a BLM/USGS archeological field crew delineated four (A through D) areas of occupation or localities within the site. These localities, along with research strategies employed in their investigation, are briefly described. Artifacts recovered from each area will be discussed greater detail in a later section of this report.

Locality A

1. General

Locality A (see fig. 3) is located at the highest point of the bluff and is the largest and most important locality within the site. A number of distinct activity areas are situated within the locality and form a fairly extensive area of occupation in excess of 30,000 square feet. Soils of locality A are fairly shallow, are generally less than 10 inches deep, and represent poorly to moderately developed inceptisols (see soil description, table 3 and fig. 10). Their origin is partially due to periglacial loess deposition, although their character is to a large degree affected by the limestone/chert/dolomite bedrock of the Lisburne Group. Vegetation

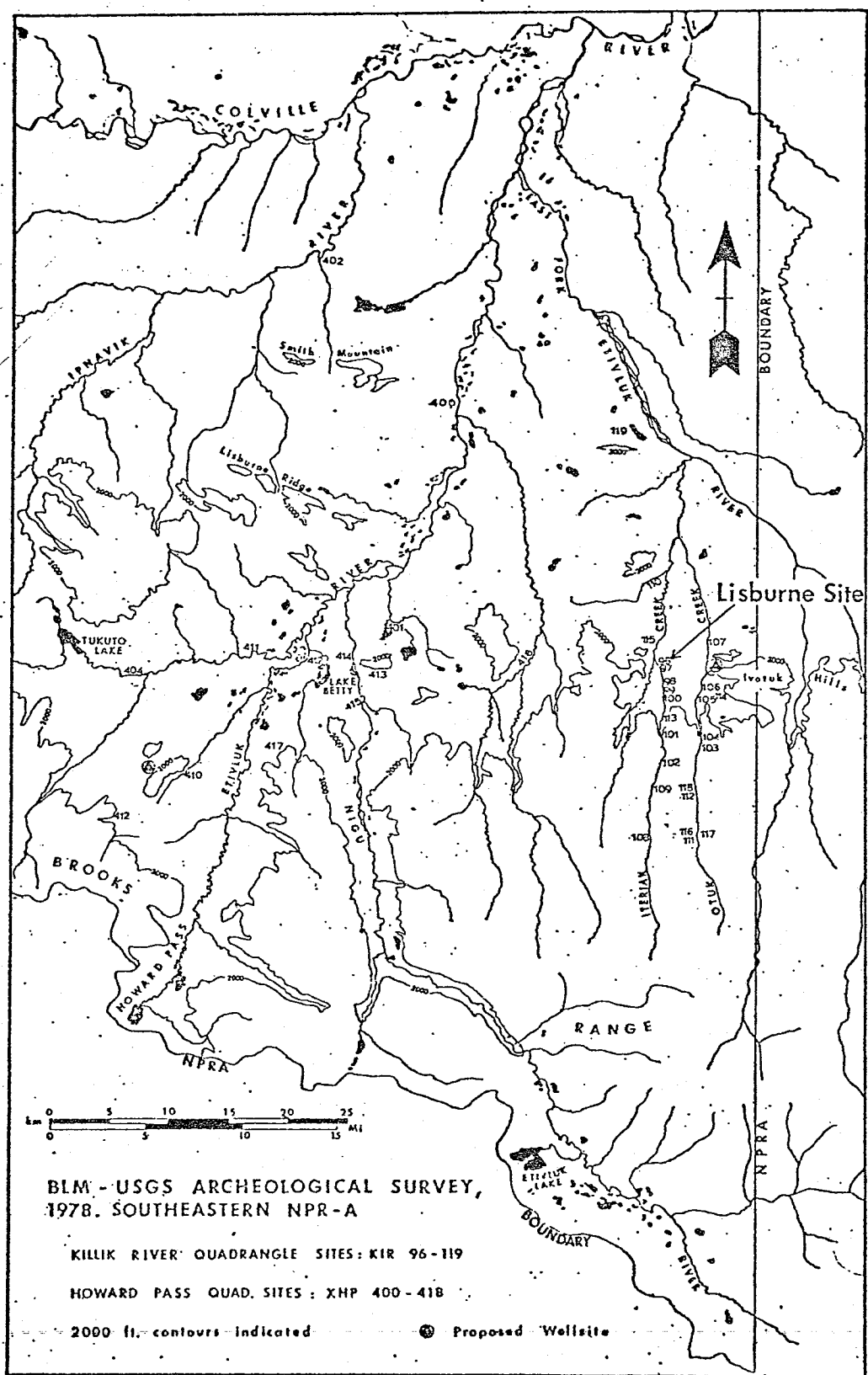


Fig. 2. Map "A"

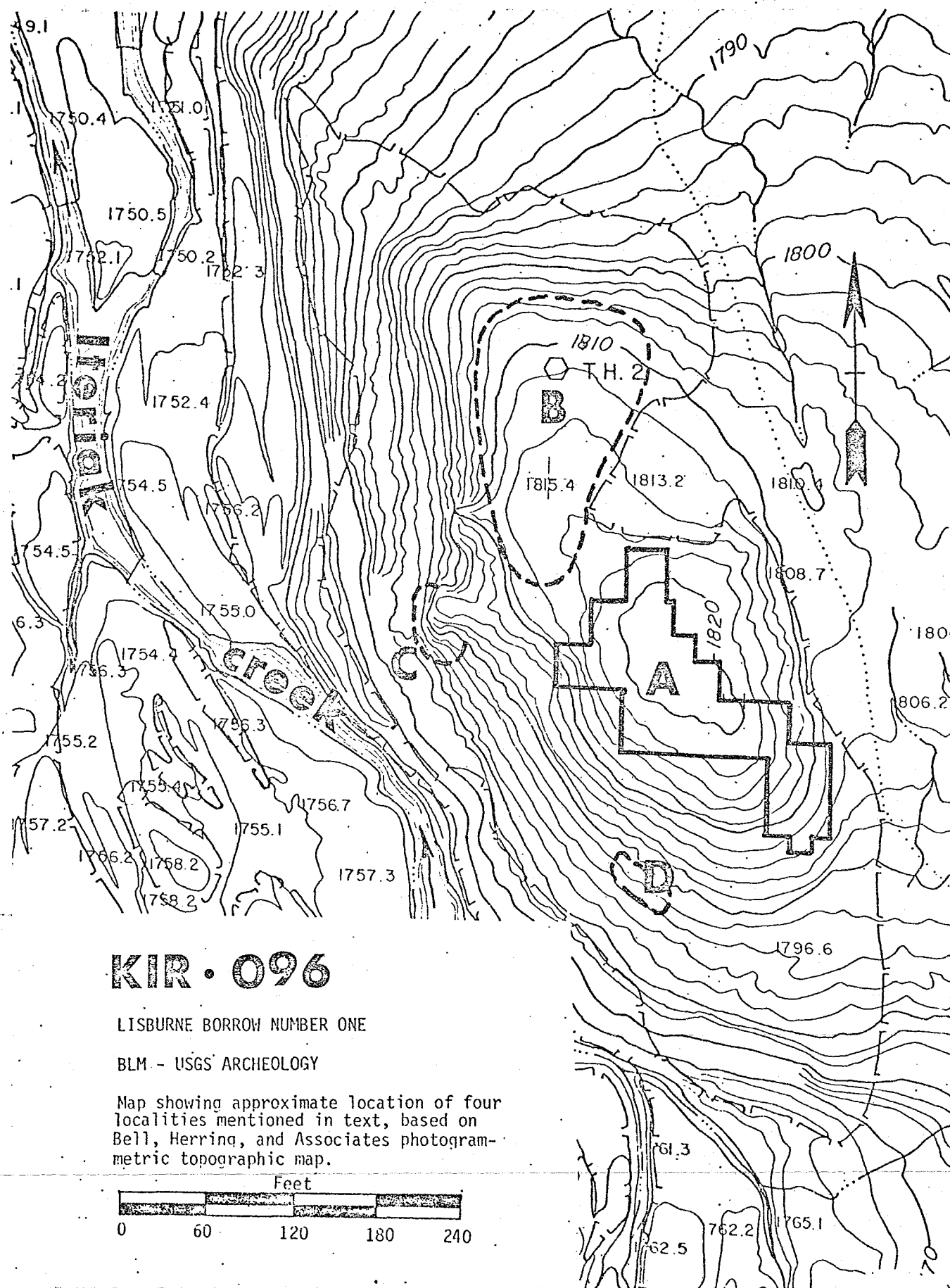


Fig. 3. Map Showing Major Localities Mentioned in Text. (Preliminary).

consists of a moderately thin mat of dryas, lichen, sedges, grasses, moss, dwarf birch and willow. Due to the site's soil chemistry, low rate of sediment deposition, and vegetation, preservation of organic artifacts and faunal remains within Locality A is poor.

2. Strategy

Initial excavations within locality A disclosed that the surface indications (when present) in this area rarely reflect subsurface density, extent, or concentration of cultural material. As a result, three phases of subsurface testing strategies were employed. Initially, 4' by 4' test squares and non-systematic test pitting of the periphery of the excavation area was implemented, as illustrated in fig. 5. After trying this method, it was felt that it was not adequately exposing areas of lithic concentration. This technique was thus abandoned in favor of a systematic radial testing pattern in conjunction with 4' by 4' gridded test excavations (see fig. 6). Test grid squares indicated discontinuous distribution of lithic detritus occurring in discrete concentrations which averaged 3'-6' in diameter. The radial testing program was abandoned in favor of intensive systematic shovel testing capable of isolating the discontinuous concentrations of cultural debris. Large blocks (100' x 100') of the test excavation area were gridded off and a shovel test was dug in the center of each 4' by 4' grid unit. Soil removed from the shovel test was screened through 1/4" mesh screens and cultural material was bagged by grid and plotted on a master grid map. As indicated in fig. 7, the shovel tests represent an approximate 4% sample of the gridded site area. The shovel test data (e.g. presence/absence) directed the excavation strategy. Grid units with negative shovel-test results were excavated only when distributions in adjacent excavated squares indicated a continuation of cultural materials. 4' by 4' squares were excavated in natural units; debitage was collected in 2' by 2' quadrants. All artifacts were mapped in to the nearest inch. The testing and excavation of locality A was regarded as the highest priority in assessing the significance of the site, and will serve as the main focus of this preliminary report. Fig. 4 shows actual artifact concentrations.

3. Cultural Materials

Locality A produced a fairly large inventory of lithic materials which typologically suggest at least 3 temporal occupations (fig. 8 and 9). The technological and morphological aspects of the lithic material recovered from locality A suggest affinity with the Akmak Assemblage of Onion Portage, Locality One of Gallagher Flint Station,

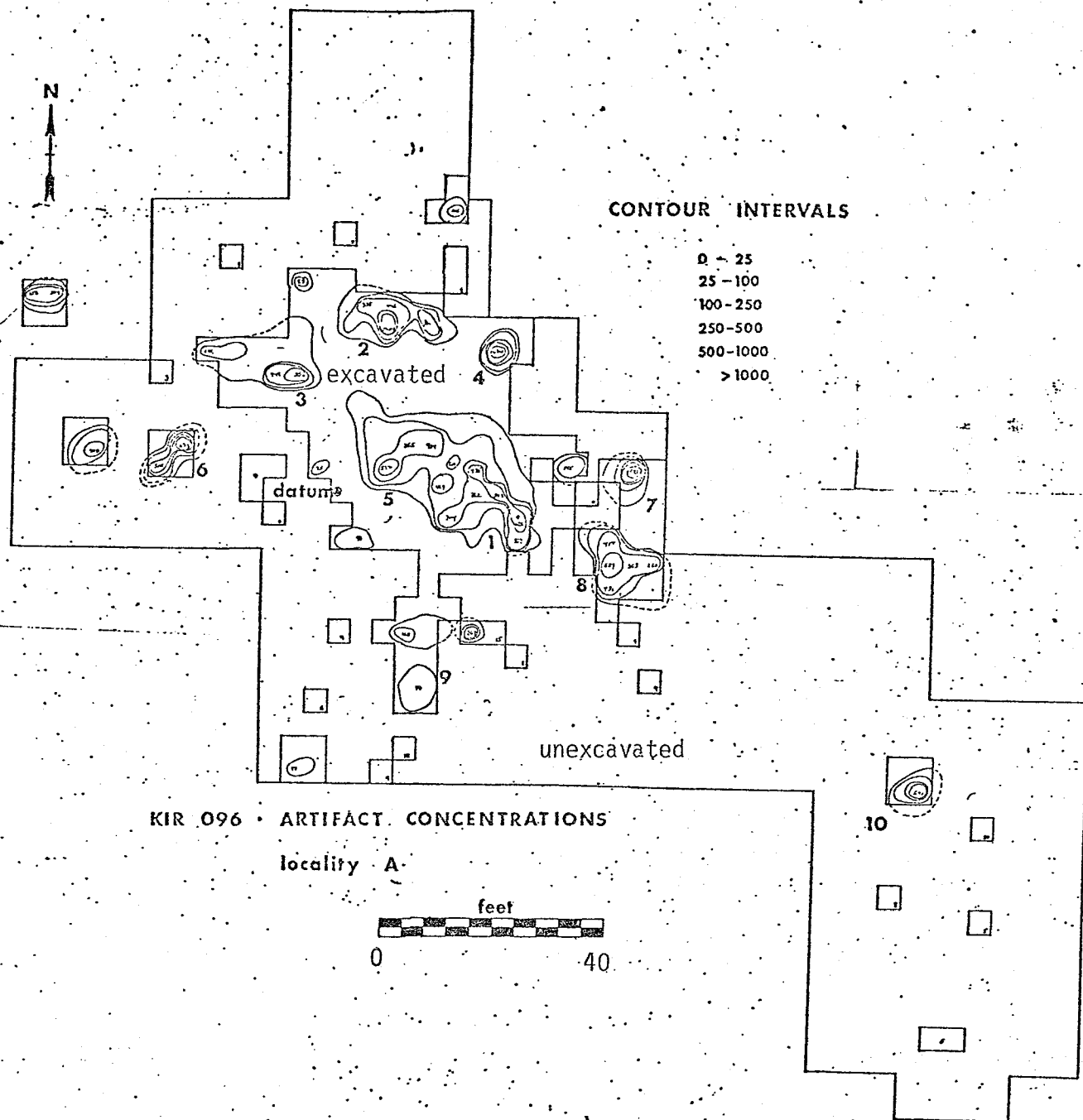


FIG. 4 Artifact Concentrations, based on total artifacts and flakes per four foot grid square. Numbers refer to Basic Analytical Unit (BAU) within locality A. Tentative assignment of BAU's based on relative density and apparent typological associations.

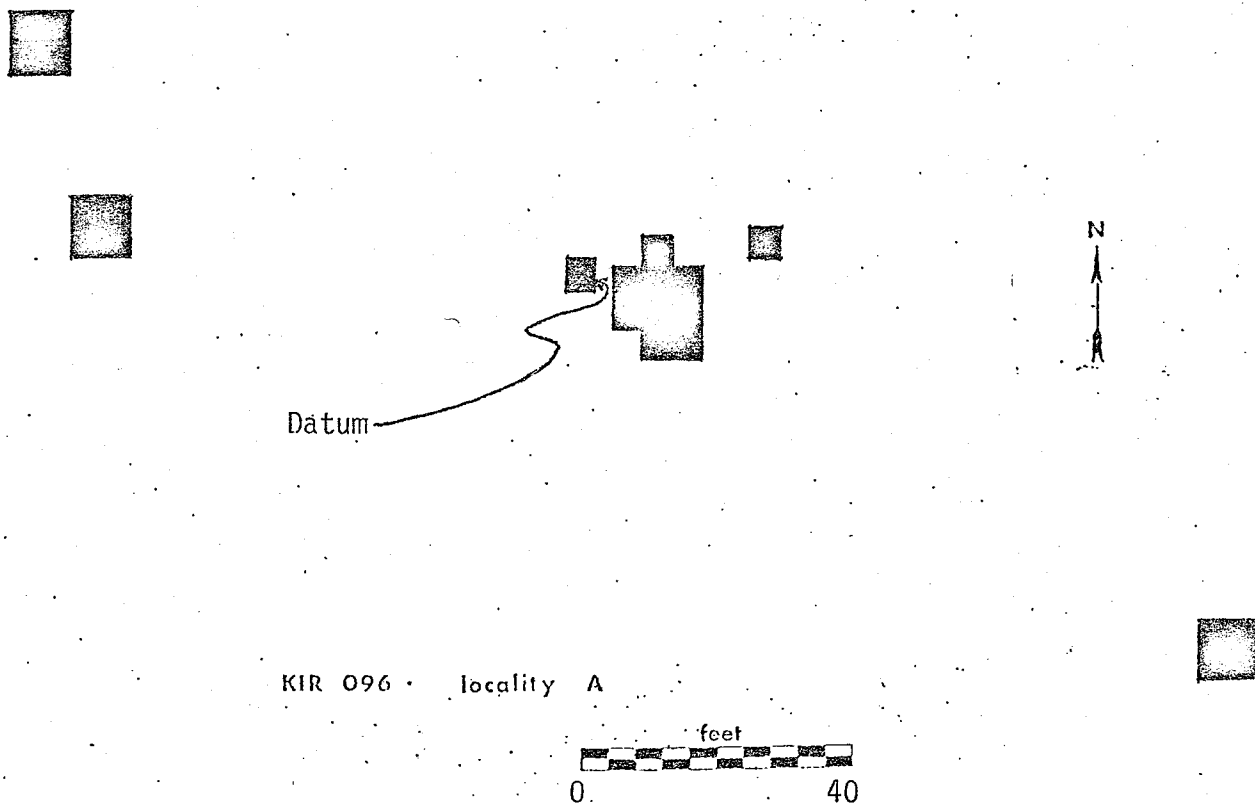


Fig. 5. Locality A. Plan showing phase 1 test excavations.

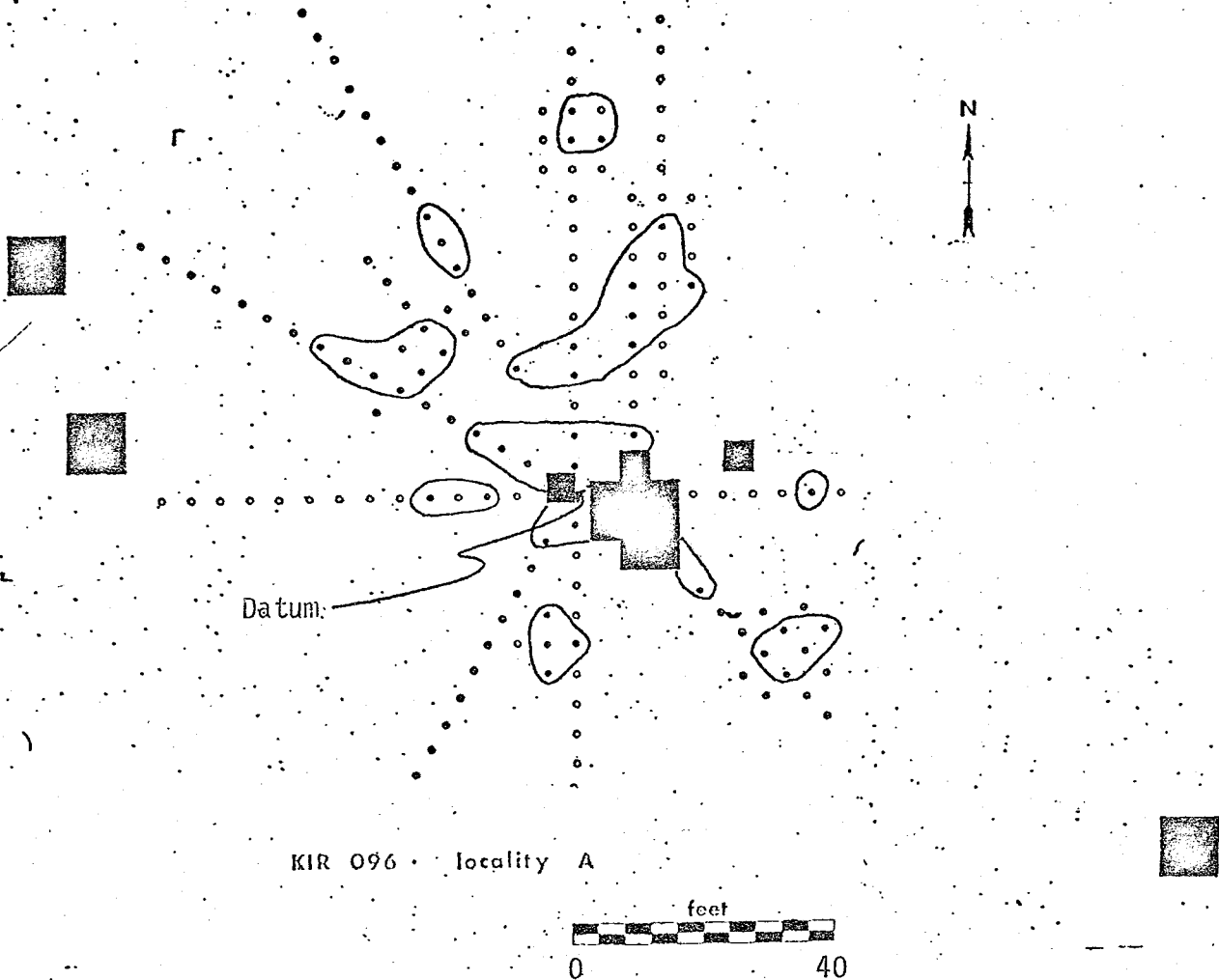


Fig 6. Locality A. Plan showing radial testing pattern (phase 2). Heavy lines indicate predicted areas of artifact concentrations. Dots indicate shovel test pits located every 4 feet. Shaded blocks (phase 1 test) indicate areas excavated prior to initiation of radial testing. Compare predicted concentrations with actual concentrations shown in Fig. 4. Shaded dots indicate shovel test pits yielding cultural materials.

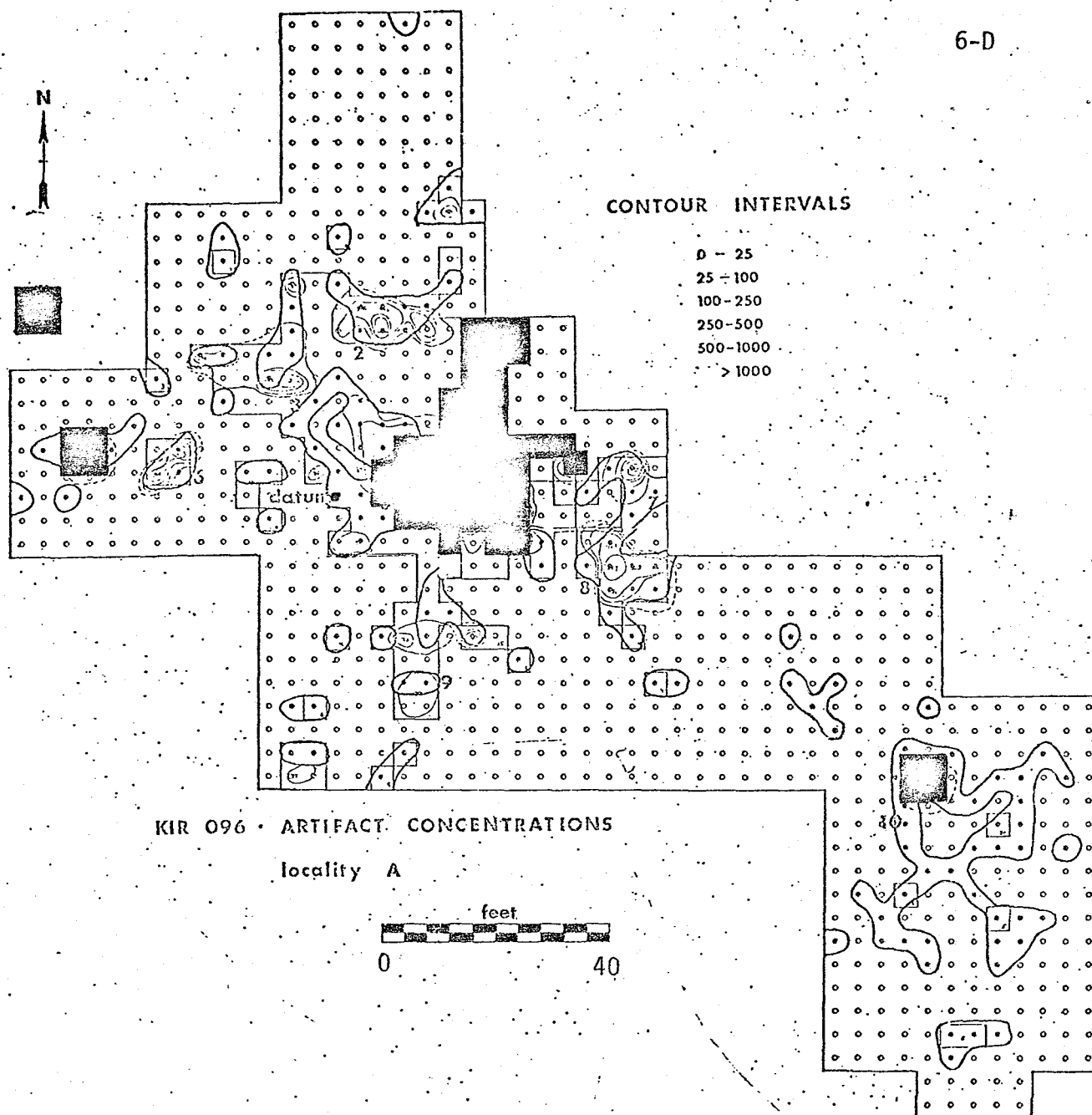


Fig 7. Locality A. Plan showing systematic testing procedure (phase 3). Dots indicate shovel test pit dug in center of every 4' square. Heavy lines indicate predicted areas of artifact concentrations. Shaded blocks indicate areas excavated during phase 1 and phase 2 testing, and prior to initiation of systematic testing. Compare predicted concentrations with actual concentrations as shown in Fig 4. Shaded dots indicate shovel test pits yielding cultural material. Superimposed on fig. 4.

Putu Site, O. P. Northern Archaic Materials (these artifacts are discussed in greater detail elsewhere in this report), the Anaktuvuk Kayuk complex, and sites from the Kelley, Noatak and Nimiuktuk Rivers. Locality A has yielded a number of large percussion-flaked blade cores (some of which have been rotated), core tablets, large blades, chert and obsidian microblades, flake cores, core bifaces, burins on blades, notched flake burins, elongate bifaces, various unifacial tools, more than 27,000 waste flakes, and a variety of projectile point forms. Included in the latter category is a segment of a fluted projectile point. Also recovered from locality A are a number of specimens which indicate occupation during Eskimo continuum periods such as Norton or Ipiutak.

Locality B

1. General

Locality B is located approximately 150' to the northwest of Locality A. Locality B is virtually devoid of vegetation and is characterized by a surface pavement of decomposed and fractured limestone/chert bedrock. Sediment deposition and soil development in this portion of the site are negligible. Locality B is characterized by a number of surface lithic scatters ranging over an area of approximately 35,000 square feet.

2. Strategy

Investigation of this mostly unvegetated locality demonstrated that the surface scatters were a fairly reliable indicator of the presence and horizontal extent of cultural material. Field strategies employed in the testing and evaluation of locality B included shallow test excavations (twenty-three 4' by 4' squares) tied into locality A site grids, and intensive surface mapping and recovery of artifacts. All artifacts recovered on the surface of locality B were mapped in to the nearest inch while all debitage was collected by 4' by 4' grid unit.

3. Cultural Materials

The nature of the cultural material from locality B is generally the same as that from locality A, although the proportion of finished tools is noticeably lower. Locality B is characterized mainly by primary quarry debitage; a few large blade cores, blade-like flakes, flake cores, non-utilized flakes, and several possibly burinized

blades. Diagnostic artifacts recovered from this locality include two Campus-type microblade cores, one Norton-like discoidal scraper, and the base of a notched and basally thinned point reminiscent of forms found in the Northern Archaic levels at the Onion Portage site (Anderson 1968a). Based on preliminary observations, three temporal occupations appear to be represented at this part of the site.

Also located within Locality B, at the extreme northwest corner of the site, is a stone cache pit/inuqsuq. This feature has not been related to any other cultural material on the site; hence, its age and cultural affiliation are unknown. It may indicate occupation of the site during the late prehistoric or historic periods (e.g. Western Thule/Nuniamuit).

Locality C

1. General

Locality C (see fig. 2) is a rock overhang located 225' southwest of the primary site datum (28' below datum elevation) on a low bench or terrace that rings the site from southeast to northwest. This feature is composed of limestone/chert bedrock and could have provided a secluded habitation locale as it forms a natural shelter approximately 15' long and 4' deep. (Observations of this feature made during March revealed a large snowdrift which formed a protective "wall" in front of the overhang--an ideal protection from the elements.)

2-3 Strategy/Cultural Materials

A total of ten 4' by 4' test squares (max. depth: approximately 18") in and near the "rock shelter" yielded a few dozen flakes (primary quarry/decortication, and secondary retouch/pressure flakes) and several bone fragments (*Rangifer* sp.). This area was of special interest as it is the only locality at the site that held potential for moderate preservation of organic remains.

A total of 160 square feet area was tested in locality C; 32 square feet beneath the shelter, 32 square feet in front of the shelter, and 96 square feet to the south of the shelter. One possible bone artifact, a medapodial "awl", was recovered from this locality. Additional test excavations of this area are planned for the 1979 season.

Locality D

1. General

Locality D is the remainder of the lower bench on which locality C is situated, which rings the site from southeast to northwest. The linear extent of this lower bench is approximately 855'. In no location does the level area of the terrace exceed 15' in width and for most of its length it does not exceed 6' in width. There are several sections of the terrace where there is no level surface; these sloping sections amount to approximately 20% of the length of the terrace. Lithic debitage was recovered in one small area on the southern end of this bench, and appears to be limited to a single activity locus.

2. Strategy

Shovel test pits approximately one foot in diameter were dug along the entire length of the terrace at 8' intervals. Material from these pits was screened through 1/4" mesh screens. Only two of these test pits produced flakes--the rock shelter area (see locality C discussion) and a small prominence on the south face of the terrace (fig. 2). Additional small scale testing was considered for this area but was felt to be of low priority, due to the topographic setting of the locality relative to the remainder of the site. Due to the time and manpower limitations, no more testing of locality D was carried out prior to the close of the field season.

3. Cultural Material

Lithic debitage was recovered from only two of 100 test pits. No formal artifacts were recovered in any test pits. At this time it is impossible to assign an age, cultural affiliation, or cultural activity to locality D of the Lisburne site.

TABLE 1

Tentative Techno-Cultural Affinities
Lisburne Borrow #1

Tradition	Possible Affinities	Artifacts
Late prehistoric or historic Eskimo (?)	W. Thule/Nuniamuit (?)	Cache pit/inuqsuq in locality B
Arctic Small Tool Continuum	Possible Denbigh Flint Complex; Norton/Ipiutak	Discoidal scraper, parallel oblique pressure flaked side blades, drills, obsidian micro- blades. Material: chert and obsidian.
Northern Archaic	Portage	High shouldered oblanceolate projectile points, basally thinned notched point, semi- lunate bifaces, small elongate bifaces, flake unifaces. Material: local cherts and chalcedony.
-----	Kayuk/Bedwell	Basally thinned lanceolate projectile points. Material: chert.
-----	Putu	Fluted projectile point. Material: chert
American Paleo- Arctic	Akmak/Kobuk	Blade cores, flake cores, Campus type microblade cores, blades, burins, elongate bifaces, utilized flakes. Material: varying grades of local chert.
-----	Gallagher	Variety of percussion-flaked blade and flake cores (some rotated), blades. Material: silicified siltstone and mudstone (?), some local chert.

TABLE 2
KIR-096 Locality A
Artifact Summary

<u>Code</u>	<u>Category</u>	<u>Number</u>	<u>Percentage of Non-Debitage*</u>
01	Cores & Core Fragments	50	8.4
02	Core tablets	10	1.6
03	Blades	192	32.5
04	Microblades (Non-obsidian)	54	9.1
05	Microblades (Obsidian)	6	1.0
06	Burins	20	3.3
07	Burin Spalls	6	1.0
08	Flake Cores	31	5.2
09	Bifaces (Complete)	36	6.1
10	Bifaces (Fragment)	70	11.8
11	End Blades/Side Blades/ Projectile Points	12	2.0
12	Drills	3	.05
13	Discoidal Scrapers	2	.03
14	Unifaces	5	.08
15	Blade-like Flakes	52	8.8
16	Retouched Flakes (list not complete)	39	6.6
17	Flakes (Unmodified)**	26,455	---
18	Cobble (Modified)	5	.08
19	Hammerstone	3	.05
20	Bone (Rangifer)	3	---
21	Bone (Citellus)	2	---
		<hr/> 27,040	<hr/> 97.69

Notes:

* Number = 590, or 2.1 per cent of total lithic inventory.

**Debitage represents 97.9 percent of total lithic inventory.

THE ARTIFACTS

The following discussion will review the major classes of artifacts recovered during the 1978 field season. The vast majority of these specimens were recovered through excavations of the major locality A loci (see fig. 4). Although distributional analyses have not yet been completed, there does appear to be a number of spatially-discrete loci of activity, which could indicate either temporally separate occupation, or multiple activity loci within a single period of occupation. As indicated in fig. 4, locus 1 represents the major concentration of core and blade materials within locality A. Locus 2 revealed a fairly high proportion of burins. Locus 5 produced a very tight cluster of projectile points of probable Northern Archaic affinity. The majority of Eskimo continuum artifacts were recovered from locus 4, and to a lesser extent, locus 10. The single fluted point was located in locus 3, an area which has not yet been clearly defined in terms of cultural affinity. In general, although there is some mixing of cultural materials through both multi-occupation and cyroturbation, there does appear to be a basic homogeneity and spatial separation of the major loci within locality A.

CORES (N=50)

Cores from the Lisburne site are quite varied, both in terms of technology and morphology. In general, they appear to have resulted from a percussion flaking technique; this is suggested by the variation in blade facet widths, platform removal scars, and sinuous blade margins. Blades detached from the cores range from macroblade to microblade size (cf. Taylor, 1959). There appears to have been little aboriginal selection for a particular blade size, although such observations could be masked by the curation and selective removal from the site of a given blade size.

The cores from the site were prepared variously from rough bifaces, large thick flakes, and most commonly, from large tabular pieces of chert and silicified siltstone. Most possess a bifacially flaked keel opposite the striking platform. Core edges were prepared prior to blade removal by both abrasion and minute chipping ("rasping", cf. Semenov 1964). Cortex removal is rarely complete on the specimens recovered during the 1978 excavations. Preparation of the striking platform was most commonly accomplished through the removal of a series of platform rejuvenation flakes (tablets), detached via a blow delivered to the fluted surface. Several oval platformed specimens were recovered. Rotated and multi-platformed cores are common. Several of the specimens have been rotated 180 degrees, with blades struck from both ends.

Typologically, the forms from KIR 096 can be compared with polyhedral cores from the Akmak assemblage (Anderson 1970, plate 2 and 3:24-30), Campus-type wedge-shaped cores (Anderson 1970:31;1972:607), and a variety of "generalized" core forms similar to specimens from the Gallagher Flint Station (Dixon 1975). With the exception of the two wedge-shaped cores from the site (fig. 8, M), which were surface collected from locality "B", most of the cores cluster in one spatially-discrete workshop locus (1) within area "A" (see fig. 4). Additional similarities in core morphologies are seen between the Lisburne tabular and polyhedral cores and materials from the Utukok River and Nimiuktuk regions of northwest Alaska, (Humphrey 1970:266-268; Anderson 1972:81-82).

CORE TABLETS (N=10)

Core platform rejuvenation flakes were excavated from the main concentration of core and blade related materials in locality A. Although they differ considerably in gross morphology, they all appear closely similar in terms of manufacturing technique. They were detached from the core by means of a blow delivered to the blade facet face of the core, from a point approximately 10 mm below the rim of the striking platform. It is evident that an attempt was made by the aboriginal artisans at the site to remove the entire platform of the core through a single blow, rather than through a series of small rejuvenation flakes. The result of the detached tablet was a deep negative bulb of percussion on the platform surface of the core, which served to create the requisite platform angle for subsequent blade detachment.

The technique apparently in use at the Lisburne site is generally similar to the one described by Mauger (1972) for the Campus site. Although the end products are morphologically dissimilar, the means of rejuvenating worn striking platforms appear to have been identical.

BLADES (N=252)

Blades from the Lisburne collection are varied in size, shape, and apparent function, as might be expected given our previous discussion of cores. Most have sinuous lateral edges and appear to have been detached from the core by direct percussion, rather than by a controlled punch or indirect percussion technique. It appears that a number of blades were produced for later bifacial reduction (based on several bifaces made on blades).

Five obsidian microblades were recovered during the 1978 excavations. These were all apparently manufactured elsewhere, for there is no evidence of obsidian core or core by products at the site. All, except one, are medial fragments, and all are retouched along both lateral margins. The mean lengths, (12.6 mm), widths (5.86 mm), thicknesses (1.86 mm), and index (28.20) suggest possible similarities in metric attributes with Denbigh collections (cf. Anderson 1970b). I do not, however, claim any great comparative significance to such measurements, given our small sample size.

Half of this collection of obsidian artifacts is being submitted for obsidian hydration analysis to Leslie Davis. The "Alyeska I" hydration rate, developed by Davis in 1976 (Davis, in Cook 1977) proved to be quite reliable when applied to obsidian recovered from sites north of the Brooks Range along the Trans-Alaska pipeline. As the Lisburne site is located in the same basic physiographic province and contains similar soils as the pipeline sites, the "Alyeska I" rate may provide an absolute date for at least one occupation of the site.

BURINS (N=20)

Burins from the Lisburne site were produced from large thick flakes and blades. There are no Denbigh-type burins in the collection, except for a single possibly-aborted attempt at manufacturing a mitten/shaped burin. Both longitudinal and transverse types are represented, some have been rotated to facilitate spall removal from 2 or 3 directions. A number of specimens have been notched to prepare a striking platform for the removal of burin spalls. Most of the burins in the assemblage have been utilized, as evidenced by minor retouch along the edge of the burin facet. The notching, morphology, and general manufacturing technique is identical to the burins described by Anderson for the Akmak and Kobuk assemblages from Onion Portage (Anderson 1970, 1970b). These artifacts suggest occupation of the Lisburne borrow #1 during the American Paleo Arctic Tradition period (Anderson 1970b).

BURIN SPALLS (N=6)

Few burin spalls are present in the assemblage from KIR 096. Presumably, spalls were a desired end product of burin technology and were carried from the site. One noteworthy exception (fig. 9-P), is square in cross section, and has been retouched on both lateral margins. The distal end is missing, broken off in a hinge fracture. An interesting attribute of this particular specimen is

that it exhibits retouch along approximately two thirds of the lateral margin, with none on the proximal one third. This possibly suggests that the spall was hafted for at least the upper one third of its length. It is also apparent that the distal hinge fracture served as a working surface for further retouch or utilization, similar in function to Denbigh burin spall artifacts (Giddings 1964: 220-228). However, the burin from which this spall was detached in no way resembles a DFC-type burin (fig. 9-M); it is a multifaceted longitudinal burin manufactured on a blade or blade-like flake, similar in technology and morphology to burins described for the American Paleo Arctic tradition (Anderson 1970b).

PROJECTILE POINTS/END BLADES (N=10)

A number of point forms were found at KIR 096 which compare typologically with other northwest Alaska assemblages. The single fluted point found at the site (fig. 8-G), is closely comparable to specimens from the Putu site (Alexander 1974), sites from the upper Utukok River drainage (Thompson 1948, Solecki 1951, Humphrey 1966, 1970), Girl's Hill Site (Gal 1976), and Batza Tena (Clark 1975). The single specimen from KIR 096 is green chert, 40.4 mm long, 20.0 mm wide and 5.8 mm thick. It is fluted on both sides; the dimensions of the 2 flute scars are 24.8 by 10.1 mm and 28.4 by 10.2 mm. The tip and the base are both broken off; the nature of the termination suggests breakage during the fluting procedure. The lateral edges show no indication of grinding. It is suggested that this specimen was broken during manufacture, rather than as a result of usage.

A series of 7 morphologically-similar points were recovered from within a small locus within locality A. These are all very close in terms of workmanship, apparent stage of reduction, and outline. The metric attributes of these specimens are as follows: mean length: 43.05 mm, width: 26.74, thickness: 7.28. They are made from chert of various grades and colors. None of the specimens show any basal or edge grinding. They are only roughly flaked, probably by direct percussion, and flaking is non-patterned and random. These points may represent unfinished preforms. As illustrated in fig. 8-F and fig. 9a-d, they are straight based, are ovate in outline, and biconvex in cross section. The homogeneity in forms and spatial proximity among these specimens suggests they represent a single occupation.

External typological similarities with this collection of points is equivocal. They show some affinity with specimens observed in the Onion Portage collection housed in the Haffenraffer Museum. Based

on morphology and general flaking techniques, they could be associated with Northern Archaic Tradition of northwest Alaska. The closest analogies to these forms are with the Portage Complex, Band 5:2 at Onion Portage (cf. Anderson 1968a and b). They could represent either finished points or preforms for a number of side notched forms, as suggested by minor corner notching retouch on one specimen. They also show similarities with other Northern Archaic collection such as Palisades (Giddings 1962, 1966), Tuktu (Campbell 1961, 1962), and the lower Palisades levels at O. P. (Anderson 1968a and b). A number of similarities are also seen between these forms and point variants found in the Kayuk collection (Campbell 1959, 1962). Forms similar to the 7 specimens from Lisburne have also been reported by Hall (1975), from the Storm Creek area, and by Anderson (1972) from the Nimiuktuk River.

One example of a Palisades style notched point (Anderson 1968a) was recovered during the surface mapping operations in Locality B. This specimen (fig. 9-E) is a basal portion, broken at midsection, biconvex in cross section, and shallowly notched on both sides by means of a secondary flaking applied to both faces. The point is lightly ground in the notches, and was presumably intended to be hafted. The base is heavily thinned; one flute-like thinning scar extends from the base up to the mid-section break, and may have been the flaking action which broke the piece. The flaking style, form, and material type (black chert) are unlike that of the Putu-like point found at Lisburne. It appears more closely similar in morphology and technology, especially in the treatment of the basal thinning and side notching, to specimens from Onion Portage (Anderson 1968a and b).

Another interesting point from the Lisburne collection (fig. 8-A) is closely analogous to Kayak forms, such as those illustrated in Campbell (1959, 1962), and to specimens from the Nimiuktuk River (Anderson 1972). This point (points?) consists of a base and tip fragment, with a thick lenticular to diamond cross section and lanceolate outline. It is collaterally flaked, with a tendency towards basal thinning. Both the convex base and lower lateral margins are heavily ground.

A number of small bifacial artifacts from the Lisburne site indicate occupation during Norton/Ipiutak, and possibly during Denbigh periods (figs. 9F-J). This includes several endblade forms, identical to specimens from the Iyatayet Norton (Giddings 1964), and the Ipiutak collections (Larsen and Rainey 1948). These apparently were brought into the site as finished tools, as there is little associated debitage.

SIDE BLADES (N=2)

A few chert side blades were recovered from the site. One was found within the main excavation area of locality A, and a second isolated find occurred in a shovel test pit in the extreme southeast corner of locality A. These specimens are small, finely flaked, have a thin lenticular cross section, and have parallel oblique ribbon flaking across both faces. Their form, size, and fine workmanship is reminiscent of Eskimo Continuum forms, such as those described by Giddings 1964 and Irving 1962, 1964. In the absence of quantifiable association with other diagnostic Denbigh artifacts, most notably mitten shaped burins, I hesitate to place these artifacts within that complex. They could be equally "at home" within a Norton or Ipiutak side blade assemblage (cf. Giddings 1964; Larsen and Rainey 1948). Similar sentiments concerning the relative diagnostic value of side blades have previously been expressed by Kunz (1977:981), in his discussion of the Mosquito Lake Denbigh assemblage.

DISCOIDAL SCRAPERS (N=2)

Discoidal scrapers were found, in small quantities, in both locality A excavations and during locality B surface mapping. These specimens are identical to Norton and Ipiutak forms described by Giddings (1964:168, pl. 56) and Larsen and Rainey (1948:103-194). They are bifacially flaked, and were manufactured from large chert flakes. They have a relatively thin lenticular cross section. Microscopic observations of one specimen indicate considerable use-wear, with both polish and striations are evident on the lateral margins (fig. 9-M).

UNIFACES (N=5)

A number of unifacial implements were excavated from locality A. Fig. 9-R, illustrates one example of these specimens. This was made from a thick chert flake, and was steeply retouched on the distal end. Microscopic analysis of the working edges suggest it functioned as an end scraper. It is 57.3 long, 39.8 wide, and 12.7 thick, with a steep edge angle on the distal end.

Typologically, these specimens are similar to Anderson's Formal class VII large flake uniface found in the Akmak assemblage from Onion Portage (Anderson 1970:51-55). They differ in that they are slightly smaller, and were utilized most heavily on the distal end, rather than the lateral margins, as in the case with the materials

from Akmak. Due to the generalized form of these implements, and small sample size, I hesitate to make any more than passing remarks concerning techno-cultural affiliations. It also is possible that specimens such as fig. 9-R, are in fact a variant of unifacial flake knife, such as those described by Giddings (1964:223-227, pl. 69) for the Iyatayet Denbigh assemblage.

BIFACES AND BIFACE FRAGMENTS (N=106)

Bifaces represent one of the numerically largest artifact classes found at the Lisburne site. I here distinguish bifaces from what I regard as more finished forms such as end and side blades, projectile points, or bifacially worked drills.

The nature of the biface technology at the Lisburne site suggests that quarry reduction preforms and quarry blanks were being produced on site. These specimens show a wide range of forms, ranging from elongate Plano-convex to bifacially worked tabular pieces. Most contain a fair amount of cortex. All of those examined appear to have been produced by direct freehand percussion, possibly with the use of a hard hammer percussor. Little in the way of comparative observations can be made with these relatively amorphous implements. They are most probably primary quarry blanks, which were broken during manufacture. There is little indication of use wear on the edges.

DRILLS (N=3)

The small collection of drills from KIR 096 fall into two categories. One type (fig. 9-L) was manufactured on flakes or blade like flakes, with the distal end retouched unifacially through steep secondary retouch. These implements are unifacial. A second variety of drill (fig. 9-K) was bifacially prepared from a blade or blade-like flake. The drill bit (distal end) is thicker than the proximal end, and makes up more than half the length of the tool. The bit end is lenticular in cross section, in contrast to the comparatively flatter proximal end. There has been considerable usage of the distal end of this artifact.

The two types of drill variants from Lisburne appear to be technologically and morphologically similar to drills from Norton and Ipiutak sites (Giddings 1964:173, pl. 53; Larsen and Rainey 1948:105, pl. 20). The unifacial specimens are reminiscent of forms which Giddings suggested were hand held (1964:173), while the bifacial variant may have been hafted.

HAMMERSTONES (N=3)

Several glacial cobbles found at the site were worn in such a way as to suggest a function as hammerstones. These are generally about baseball sized, and ovate in form. Material types include granite, sandstone, and quartzite. Wear patterns occur on the small ends of the cobbles, and show considerable pocking and battering. They may have served as percussors used in biface reduction activities.

FLAKES (N=26,455)

MODIFIED FLAKES (N=39)

As indicated in table 2, the vast majority of the Lisburne lithic assemblage consists of debitage. This fact should come as little surprise, considering the proximity of this site to lithic source areas. Figure 4, illustrates the approximate density and distribution of chipping debris at the site.

Less than 5 percent of the flakes recovered from KIR 096 have been, or appear to have been retouched. Microscopic examination of the edge wear patterning indicates these functioned as scraping implements. Magnification under 70x power magnification reveals small rasping flakes, and slight indications of striations. This relative proportion should be regarded as tentative, as we have only just begun to examine in detail the debitage from the site.

FAUNAL REMAINS (N=5)

A few small fragments of bone were recovered from the site, primarily from the rock overhang area indicated as locality C. (Several small bone scraps, probably recent, were found in locality A excavations.) This was the only part of the site with sufficient sediment accumulation and organic soil formation to have enabled appreciable preservation of bone. Thus far, less than six caribou bones (Rangifer tarandus) and 1 ground squirrel bone (Citellus parryi) have been recovered. Additional testing beneath the rock overhang will be conducted during the 1979 field season to attempt to expand this sample.

BONE ARTIFACT (N=1)

One caribou metapodial fragment appears to have been modified intentionally. It measures 131.2 mm in length, 25.4 mm in width, and is 20.0 mm wide. It has been split longitudinally, with the distal end modified as an awl-like implement. Microscopic analysis

1

FIGURE 8 ARTIFACT DESCRIPTIONS

- A. Projectile point(s)
- B. Biface
- C. Biface
- D. Biface
- E. End Blade
- F. Projectile Point
- G. Fluted Point
- H. Core
- I. Core
- J. Core
- K. Core
- L. Core
- M. Wedge Shaped Core (locality B)
- N. Core
- O. Burin
- P. Burin
- Q. Burin
- R. Burin
- S. Core Tablet
- T. Core Tablet
- U. Core Tablet

1

All specimens from locality A excavations unless otherwise indicated.

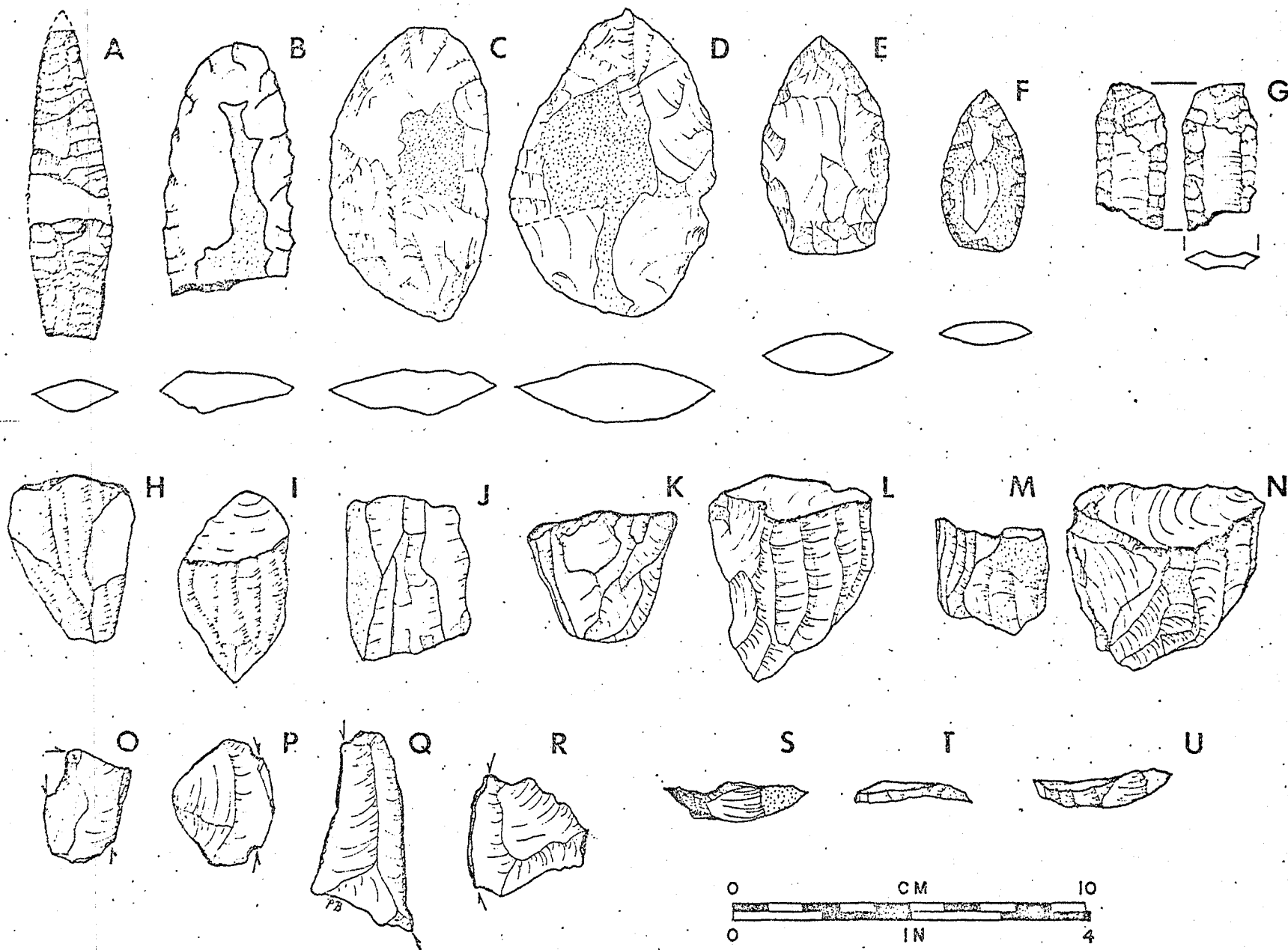


FIG. 8

FIGURE 9 ARTIFACT DESCRIPTIONS

- A. Projectile Point/Biface
- B. Projectile Point/Biface
- C. Projectile Point/Biface
- D. Projectile Point/Biface
- E. Projectile Point Base (locality B)
- F. End Blade (tip)
- G. End/Side Blade
- H. Biface (aborted burin attempt)
- I. Side/End Blade
- J. End/Side Blade
- K. Drill
- L. Drill
- M. Discoidal Scraper (locality B)
- N. Burin
- O. Burin
- P. Burin Spall
- Q. Burin
- R. Uniface
- S. Projectile Point Base (?)
- T. Biface
- U-Z. Blades
- AA. Obsidian Microblade
- BB. Obsidian Microblade

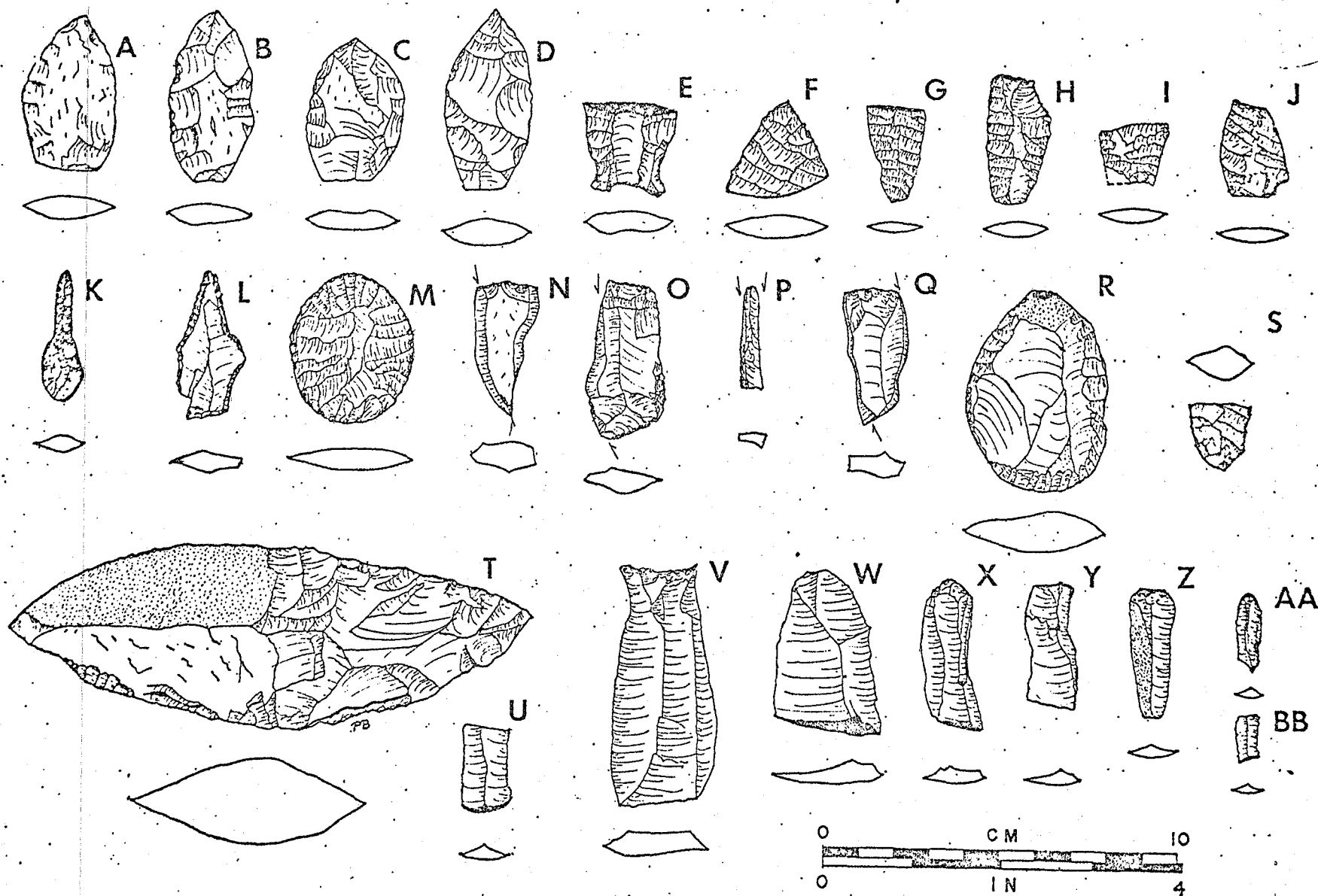


FIG. 9

indicates considerable wear and polish on the "pointed" end of this tool. This apparent awl was found in locality C, beneath the rock overhang.

DISCUSSION

At this stage of the investigation, we feel that the Lisburne site may be of considerable importance in the understanding a number of questions in the archeology of Northwestern Alaska. Obviously, the site is not without its shortcomings. It contains little soil matrix, and is subject to cyroturbation; hence the possibility is good that artifacts may be mixed. Likewise, it appears to contain little hope for obtaining datable materials, especially from the main Locality A area.

We are hopeful that specific activity areas of the site can be established by discrete and repetitive typological/morphological associations. As illustrated in a preliminary contour map of flake densities, fig. 4, there are obvious areas of lithic reduction and activity areas which can be delineated. Whether or not these can be related to meaningful and typologically-discrete associations must await more detailed plotting of all artifacts, separated out according to variables of material type, form, function, and technology. We are especially intrigued by the possibility of establishing spatial relationships and significance of the large percussion flaked cores, blades, burins, and three forms of projectile points (e.g. Kayuk, Putu, and Portage). Once the complete distribution analysis has been completed, we will be able to provide some more definitive statements concerning intra site activity areas, seasonality, length of occupation, and artifact associations. Perhaps the most significant information which can be gleaned from the site is the nature of lithic technological variability over time; e.g., how were different cultural and technological traditions utilizing common resources such lithic raw materials, vantage points, and fauna?

PRESENT AND FUTURE RESEARCH

At the conclusion of the 1978 field season the site had not been sufficiently investigated to permit its use as a borrow site by USGS/Husky. Only the northernmost portion of the site (locality B, and the northwest portion of D) were considered sufficiently clear of archeological remains to permit the mining of borrow material. At the termination of the field season, the remainder of the site (locality A, locality C, and the southwest through southeast portion of locality D) was clearly marked by placing signs at approximately 75' intervals around the perimeter. The area enclosed within these signs has been denied as a portion of the material source. During the 1978-79 winter construction program, the

"cleared" portion of the site was not utilized as a borrow area by Husky's civil construction program.

Plans for the upcoming field season call for a return to the Lisburne site by a small crew to complete excavations of locality A, and continued testing of localities C and D. The proximity of the site to an active exploratory oil well will virtually ensure a continued threat to its integrity. By the conclusion of BLM's involvement with the environmental monitoring program in NPR-A, a full report on this research will be made available to the professional community.

Acknowledgements

This fieldwork was made possible through the cooperation of the Office of the National Petroleum Reserve-Alaska, U. S. Geological Survey; particularly Edwin S. Hall, Jr., ONPR-A Archeologist. I would like to acknowledge the hard working crew who endured the 1978 field season with us: Pat Fall (Univ. of Arizona-Tucson), J. Goodson, (N. E. Louisiana Univ.) , R.J. Peterson (Michigan State Univ.), G. Reynolds (Univ. of Connecticut-Storrs), B. Saleeby (Univ. of Oregon), D.C. Slaughter (Univ. of Wisconsin-Madison), T. Smith (SUNY-Binghamton), B. Waitkus (Univ. of Minnesota), and S.M. Will (Univ. of Alaska-Fairbanks). The assistance of Ann Cannon is greatly appreciated.

Table 3

Soil Profile Description: KIR 096, sq. 18-22N, along west 5 line.
(Locality A).

Survey by: P. M. Bowers, R. J. Peterson Date: August 1978
 Soil Type: Arctic Brown soil, shallow phase (Hill & Tedrow, 1961)
 Location: 68°28'53", 155°48'29" Umiat Meridian, Killik River Quad-
 range.
 Vegetation: Dryas, Lichen, Sedge, Grasses, Dwarf Willow, Dwarf Birch.
 P.M.: Minor loess accumulation overlying Lisburne Group Limestone
 and Dolomite. A few glacial erratics (cobbles) present at base of
 profile.
 Climate: Arctic
 Landform: Erosional terrace; east side Iteriak Creek, 1826.83'
 a.s.l.
 Slope and aspect: 0-6%, all aspects.
 Drainage: Well Drained
 Int: Moderately rapid in solum
 Ext: Slow

Horizon Description

- 011 1-1/2" Modern Veg. mat
- 012 1/2-1/4" Partially decomposed litter
- 02 1/4-0" Well decomposed o.m., many fine roots; abrupt wavy boundary.
- A1 0-1/2" very dark brown (10YR3/2) gravelly sandy loam; weak, very fine crumb; loose, very friable, non-plastic, non-sticky; many very fine to medium roots; abrupt, smooth boundary.
- A12 1/2-1" Very dark greyish brown (10YR 3/2) gravelly loam; weak, very fine crumb; loose, very friable, slightly plastic, slightly sticky; many fine roots; abrupt, wavy boundary.
- B 1-4" Dark yellowish brown (10YR 3/6) silty clay loam; weak to medium fine crumb; hard, firm, sticky, plastic; many common fine roots; abrupt, wavy boundary. Note: B horizon absent in many sampling locations in site. Presence/absence dependent on localized drainage, amount of loess deposition, and clay translocation.
- Ccag 4-12" Very dark brown (10YR 2/2) rocky sandy loam; weak crumb; soft, friable, slightly plastic, slightly sticky; very few medium roots; frequency of angular rock fragments increases with depth.
- C+R Limestone/Dolomite/chert bedrock and decomposed bedrock.

PROFILE ALONG W-5 LINE, KIR-096

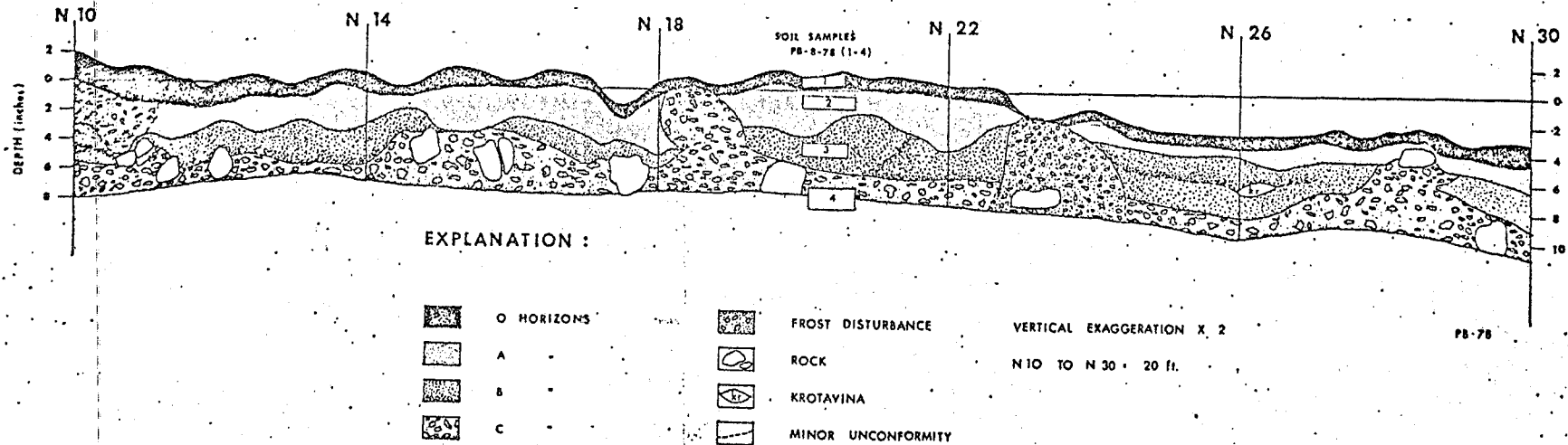


FIG. 10

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ARCHEOLOGICAL APPLICATIONS OF SMALL-SCALE FALSE-COLOR
INFRARED PHOTOGRAPHY IN THE NATIONAL PETROLEUM RESERVE-
ALASKA

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INTRODUCTION

The application of remote sensing techniques for archeological purposes in the North American Arctic has been little pursued. Harp was in the forefront of these attempts and has explored more systematically than any other researcher the ability of various remote platforms and films to discriminate earth features of archeological significance. Unfortunately, Harp's experiments in the Canadian Arctic have met with mixed success in demonstrating the utility of color, black and white, and infrared films in archeological endeavors except at low levels and large-scale. Stringer and Cook (1974) attempted to discern large abandoned village sites in the boreal forests near Kaltag, Alaska by the use of ERTS (Landsat) imagery and concluded that while the utility of landsat interpretation of large-scale archeological features could not be discounted by their study, the experimental results were equivocal. Andrews (1979) reported equivocal results from an attempt to identify cultural resources lacking obvious surface manifestations at Point Hope. Ebert (1978) and Ebert and Brown (1978) utilized manually classified landsat scenes to map vegetative cover types in order to produce an "ecologically informed, stratified sampling design" (Ebert and Brown 1978:53) for archeologists charged with assessing the cultural values of the National Petroleum Reserve-Alaska. In general, the attempts to inventory cultural resources in the Arctic from remote platforms have not been encouraging.

During the winter of 1976-77, BLM NPR-A considered developing a broad based remote sensing program and I evaluated the possibilities for utilizing various types of imagery for the inventory of cultural resources within the National Petroleum Reserve-Alaska. At that time my view was largely pessimistic as I felt that permafrost and a seasonal active zone uniform over broad areas would have a dampening effect on the ability of vegetative cover to reflect subsurface features such as pits, walls, etc. (depending upon how much of these features extended into the active zone). I held little hope (and was reinforced by the literature in this) for our ability to identify site signatures given the brevity and low intensity of occupations on the North Slope (apart from easily spotted coastal middens). I did feel however that there were great opportunities offered by remote sensing techniques for identifying areas where NOT to look for archeological sites and areas of high archeological potential. For example, analysis of landsat images over a number of years would reveal, for example, those points where the whaling lanes consistently appear, where mid-winter leads consistently appear enabling lead edge sealing, or physiographic features which consistently melt off first in the spring and offer desirable springtime camping grounds.

Utilizing known sites as infrared and Landsat training areas and identifying critical environmental parameters through the use of remote sensors and platforms were undertakings I shelved until the current petroleum exploration program in the NPR-A lulled.

The large lakes in the foothills area of the NPR-A (map fig. 1) are and will continue to be logistics focii for exploration and perhaps development activity because they can be utilized by C-130 Hercules aircraft in winter and by amphibious aircraft during the summer months. Because of the presence of large, easily identified late prehistoric village sites at a number of these lakes (Etivluk, Betty, Tukutu, Swayback, Liberator, Kinyiksukvik), this summer BLM will initiate non-destructive data recovery at some of these village sites. This summer's efforts are part of a long-range program for completely describing and inventorying the surface features and general vicinity of all the late prehistoric lake side village sites in the Reserve. The settlement data assembled over the next few years will support National Register of Historic Places District nominations to the Department of the Interior and will be the basis for a cultural resource management plan for these limited resources so that a reasoned and reasonable expenditure of archeological data will be insured.

This summer NPR-A archeologists will array ground panels on these village sites and low-level (1:3,000) black and white stereo images will be obtained. Next fall the Division of Photogrammetry will attempt photogrammetric mapping (estimate 18 inch contouring is possible) of the houses and pits at one of these sites and if the procedure proves feasible, all the sites will be mapped by this method.

As a means of planning for this summer's field activities at these lakeside villages, I examined false color infrared (FCIR) stereo photographs flown at scales of 1:60,000 and 1:120,000 by NASA during July 1977. As I started examining the 1:60,000 photos I realized that the site vicinities were presenting a distinctive reflectance. I anxiously examined each lakeshore on the 1:60,000 photos and then turned to the 1:120,000 scale photos and found the distinctive reflectance essentially discernible even at the smaller scale. The vicinities of the archeological sites were marked by a brighter reflectance.

Aerial photographs were examined under various magnifications. Initially, the 9 inch by 9 inch color contact prints were examined with the naked eye and it was this procedure which identified the distinctive reflectance of the archeological site vicinities. Color stereo pairs were then examined at from 2x to 16x under a Bausch and Lomb stereo zoom transfer scope to compare topographic, textural, and tonal characteristics between

known site areas on the same stereo pair and areas of similar bright reflectance appearing elsewhere on the pair. Other bright areas do appear on the photos and are indistinguishable from the site areas. Whether these other bright areas are archeological sites is unknown; they may very well be. However, careful stereoscopic examination can eliminate some of these other areas. It is at this point that the archeologist's knowledge of prehistoric settlement patterns and familiarity with the terrain become invaluable. Other areas, unreported as archeological sites, such as the point immediately east of the Punyik Point site on Etivluk Lake (fig. 5) warrant ground examination. I found however that stereoscopic examination is time consuming and tiring. A more rapid and almost as effective technique is to examine a single photograph under a binocular microscope. The photos discussed below were examined under 10x to 70x magnification. Binocular examination at increasing magnification has the added advantage that one can identify optimum magnification for resolution as well as the point at which film grain becomes unacceptable. The false color infrared photographs utilized here were flown by NASA during the summer of 1977. The photo missions were shot on July 19 and July 26. Both missions were flown during the estimated maximum greenup.

FALSE-COLOR INFRARED PHOTOS: FOOTHILLS LAKE SITES

TUKUTU LAKE: Hall (1976) excavated at Tukutu Lake in 1968 and 1970 and reports more than 100 house pits and over 400 cache pits at nine locations along the lake shore (areas A-I). Area A is located on both sides of a small stream entering the lake at its northwestern end (fig. 2). Lines of inuksuk converge on the shore at this point and Hall (personal communication) suspects that caribou were driven right through the village and into the lake where they were dispatched. Hall counted 34 houses and 44 pits (Hall 1976:102) in Area A. Area A is vegetated almost exclusively by sedges and grasses although willows are densely concentrated along the stream course.

Areas B, C, D, E, and F (Fig. 2) are located around the stream which flows from the Upper Tukutu Lake and enters Tukutu Lake proper at its north end. Areas B-F account for 82 houses and 323 pits (Hall 1976:102). Areas B-F are also characterized by a grass-sedge vegetative mat interspersed with low lying woody plants. Hall and I visited the site in late June 1977, at which time new grass blades were only just beginning to eclipse the dead growth of the previous season. Backfilled excavations were remarkably well vegetated. Unlike the alluvial deposits of Area A, drainage seemed better in the site areas at the north end of the lake.

Area G is a complex of 37 pits located on the right bank of a small stream entering the lake about midway down its western shore.

Area H includes 41 houses and six pits located immediately west of the lake's outlet. East of the outlet stream is Area I which occurs on a small knoll and consists of three houses and 1 pit.

On the 1:60,000 FCIR photograph (fig. 3) each site area identified by Hall is readily discernable. Within the larger pink areas (which at this point I would tentatively identify as grass-sedge vegetation) are brighter, almost white areas. The darker red following the stream and drainage courses are willow. Area G is particularly well defined by this brightness. Other light areas are also noticable along the lake shore but at the smaller scale (1:120,000) these are not as distinctive as the brightness marking the site areas (fig. 3). Hall (1975:16) remarks on the "deep midden" associated with the houses and pits.

ETIVLUK LAKE: In 1954 Irving identified nine sites on the shores of Etivluk Lake near Howard Pass. His location map (Irving, 1967:71-72) is reproduced as Fig. 4. Both sites 9 (Punyik Point) and 1 (Outlet site) are readily visible from the air by even the most casual observer. Both sites are covered by a sedge-grass-flowering plant vegetative mat. The unbackfilled test cuts at the Punyik Point site are only just now, after almost 20 years, starting to be invaded by colonizing plant species. By comparing the 1:60,000 FCIR aerial photograph (Fig. 5) with Irving's location map we note remarkable coincidence of bright reflectance with archeological sites. Site 1, consisting of 20-30 Late Prehistoric houses, appears as a large bright area. Site 2, a lookout station and campsite located on the thinly soil mantled knoll above site 1 presents no distinctive reflectance and appears identical to other knolls in the area. Site 3 (Isugnak Point) is characterized by Irving as "temporary camps" and shows up as a faintly lighter spot. (The inaccuracy of Irving's map of this portion of the lake makes interpretation difficult.) The late prehistoric winter house site at Kaksrauk Point (Site 4) shows up clearly, as does the vicinity of the meat cellars at Gale Point (Site 5). Site 6, the Isthmus, consists of a stone platform hearth and is not apparent. A faint light spot surrounded by dark red (willows?) on the deltaic deposits of a small stream entering Etivluk Lake from the south may mark the location of the temporary late prehistoric camps at West Point (Site 7). At Site 8 (Portage Point) Irving found traces of a large unidentified structure. The large bright spot visible on the aerial photo at this location marks this archeological site. Site 9 (Punyik Point) is clearly defined. Bright reflectance is returned from a point a few hundred yards east of the Punyik Point site and another

bright return is presented on the point half way between Sites 4 and 7 and may identify other sites unreported by Irving. The 1:120,000 scale photograph of Etivluk Lake gives bright returns for sites 1, 4, 5, 8, and 9. The possible unreported site areas visible at 1:60,000 are still visible at this smaller scale.

KINYIKSUKVIK LAKE: During the summer of 1961, while excavating at the Punyik Point Site on Etivluk Lake, Irving made several forays into other areas and discovered a site complex near the Nigu River which he called Kinyiksukvik. Irving (1962) notes some "fifty-odd houses" around the two lakes at Kinyiksukvik. On "a point running into the smaller of the two lakes" Irving found an "inconspicuous site" with rock-lined outside fireplaces (Irving 1962:79). On a point on the northeast shore of the smaller lake a bright return on the 1:60,000 aerial photo (fig. 6) may mark the location of this site. The National Park Service (NPS) crew working in this area in 1977 identified a site on the smaller lake (XHP-119) which, judging from their field sketch maps, corresponds with the bright return on the 1:60,000 photo. On the larger lake Irving investigated a large village area on the southwest shore. This village consisted of housepits of types also found at Etivluk Lake, cachepits, a stone kadigi and lines of stone inuksuk which converge on the lake shore. The National Park Service crews mapped this area as Locality 8 of site XHP-115 (the large lake and immediate vicinity) and counted 2 tent rings, 28 housepits, and 36 cache pits. Irving reports three other sites on the east side of the lake. One of these is probably a surface site which "high above the lake but sheltered from northerly winds, is marked by recent temporary camps and sporadic concentrations of burins, microblades and small bifaces." (Irving, 1962:80). This site description is not accurate enough for aerial interpretation. Irving's other two sites on the east side of the lake contain a variety of housepits. The NPS field party identified three site localities on the northeast shore (fig. 6). Locality 1 consisted of 6 housepits and 7 cache pits and is clearly visible on both the 1:60,000 and 1:120,000 scale photographs. Locality 2 consisted of 38 cache pits, a boulder blind or wind break, 12 house pits and 11 tent rings. This Locality gives a bright return on the photographs. Locality 3 consisted of 2 tent rings, a single house pit, and 8 cache pits. The area around the cache pits shows up as a bright spot at both scales of FCIR photographs. NPS field notes of test pits dug at the various localities producing bright returns indicate midden deposits, in places to depth.

LIBERATOR, SWAYBACK, AND BETTY LAKES: During the summer of 1967, Hall conducted an aerial survey of interior Northwest Alaska. One of the

objectives of the survey was to examine the shores of the larger lakes in the foothills area to locate late prehistoric village sites comparable to those known in the upper Noatak region. At the southeast shore of Liberator Lake, Hall (1975:15) located a late prehistoric village of more than 17 "square to rectangular houses with short or medium length entrance passages and many cache pits." The site area is well drained and is covered by a sedge-grass-flowering plant community. Further north on this eastern shore, Hall identified another site comprised of three possible houses and a number of cache pits. The vegetative cover of this second site includes willows and to the naked eye does not contrast with the surrounding cover. Of all the lakeside village sites discernable on the infrared photographs, the Liberator Lake sites are most striking at both the 1:60,000 and 1:120,000 scales (fig. 7).

Hall (1975:16) located another late prehistoric village site of at least 15 house pits and innumerable cache pits excavated into the steep hillside on the northeast shore of the largest lake in the Swayback lakes chain. The site is thickly vegetated by sedges and grasses and willows as tall as a man grow amongst the pits. Again, at scales of 1:60,000 and 1:120,000 the brightest reflectance on the lake shore is obtained from the vicinity of the archeological site (fig. 8). Another area less intensely bright than the known site area is visible on the northwest shore and warrants field examination.

The last set of photographs examined were of Betty Lake where Hall located another late prehistoric site. Numerous cache pits and twenty-odd houses are discernable at surface (Hall 1975:16). The features are strewn along higher, better drained ground than occurs elsewhere along the lake shore and the site area on both 1:60,000 and 1:120,000 photographs is marked by a brighter reflectance (fig. 9).

INTERPRETING THE PHOTOS

At this point, the apparent archeological site signatures which are visible at both scales of 1:60,000 and 1:120,000 must be heralded with reserve. No ground-truthing of any of these site areas is available. I have, however, re-examined my slides of the site areas (taken in June 1977 and July 1978) to obtain a hint of what the critical variable might be. The solution is not obvious and will require a rigorous ground-truthing program.

In every case, archeological sites are characterized by a brighter reflectance than surrounding areas. Such a response on the infrared film may indicate a lack of plant vigor, or sparse vegetation, or exposed

soils or some combination of factors. Usually plants which lose vigor due to disease or adverse soil conditions first show up as a darker red or black. Moisture loss in plants reduces infrared while the visible portion of the spectrum (green and red) remain unchanged and the stressed leaves appear as pink to white (National Academy of Sciences 1970:48).

The Betty Lake site and some of the site areas at Tukutu Lake occur on better drained ground. The two site areas on Liberator Lake occur where east-west trending ridges visible on the photos intercept the lakeshore and probably produce well-drained conditions. A number of considerations however would indicate that the brighter site reflectance is not singly attributable to well-drained or dessicated conditions caused by physiographic setting. A similar bright response is also evident on the relatively steep slopes of the housepit areas at Kinyiksukvik and Swayback lakes. Area A at Tukutu Lake is on relatively flat alluvial deposits and produces a reflectance like that of Area C which extends along a sinuous, presumably well-drained ridge. It is also apparent that the east-west ridges on the Liberator photographs only produce the brighter response in the vicinity of the archeological sites and not elsewhere along their similarly vegetated lengths.

Soil conditions and plant spacing may be factors. It is curious however that the excavated and only partly revegetated area at Punyik Point (site 9) produces the same bright reflectance as the Outlet Site (Site 1) which is thickly and continuously vegetated. 35 mm color infrared photographs of test plots with vegetative mat intact and removed will be necessary to determine the extent and nature of background reflectance possibly emanating from the soil at the site areas.

An obvious hypothesis explaining the bright reflectance of the archeological site areas is differential plant cover. In some cases, as at Punyik Point, an abrupt change in plant communities is apparent. However, such a change is not apparent at the Swayback Lake site and at Tukutu Lake. The sedge-grass-flowering plant community is a common denominator at each of the site locations with which I am familiar and presents a chicken and egg problem for interpretation. Were the villages placed where they are because the natural plant community presented a desirable location for villages? Or are the soil conditions produced by the prehistoric settlement especially conducive to the establishment of grasses upon abandonment? I was alerted to this village-site/grass relationship in 1971 by residents on Seward Peninsula who told me that if I wanted to find sites I had only to look for grassy areas along the riverbanks. Extrapolating from my slides of some of the NPR-A sites, I believe the explanation is not so facile. It appears to me at this point that the critical variable may not be the mere presence of grass

but the presence of retarded new growth grasses whose infrared reflectance has not yet overwhelmed the reflectance of the dead blades of the year before. Thus, while site areas are vegetated, the reflectance they produce is analogous to diseased vegetation or bare ground. Andrews et. al. (1977) make note that they had falsely interpreted portions of their black and white photos of the Point Hope area as unvegetated. Field examination disclosed that the bare ground features they identified from the photos were vegetated by grasses and they caution photo-interpreters that "the image of wide blade grass from the previous year on features should not be mistaken for lack of vegetation" (Andrews et. al. 1977:51). Ground-truthing of these suspected unvegetated areas at both the Ipiutak Site and Jabbertown revealed the presence of grass covered mounds in which test pits disclosed the presence of midden material (Jabbertown feature #87; Ipiutak-all four mounds tested) or permafrost (Jabbertown feature #91 and #107).

At each of the late prehistoric sites in the NPR-A locatable on the aerial photos I am either aware of or suspect the presence of cultural midden. Anyone who has ever excavated in cultural midden deposits in northern Alaska is aware of the delay (not to mention the malodor) occasioned by their usual frozen state. I find it ironic that the very condition (permafrost) which prompted my pessimistic view of attempts at the remote sensing of cultural features in the Arctic may very well be a key to identifying some kinds of archeological sites from remote platforms.

As a tentative hypothesis to explain the visibility of the late prehistoric sites on the FICR photographs of the NPR-A, I suggest that archeological middens, because of their make-up (organics and great volume voids) retain more moisture than natural soils in the same area. In temperate climates the result is positive crop marks (fig. 13). Arctic archeologists (myself included) have adopted temperate climate principles for interpreting Arctic scenes. Harp (1977:57) suggests that human activity areas will "alter and enrich the nutrient balance of these discrete areas". I suggest that the opposite may prove true in the Arctic. Midden areas may to a degree (limited by depth of active zone) enrich the soil and perhaps influence speciation, however, in most instances I suspect the enrichment effects will be overwhelmed by a local coldspot caused by a frozen or late-thawing midden.

Midden areas retain more moisture and therefore once frozen, require more caloric input to melt during the summer than less saturated natural soils with similar insulating vegetative mat. The resultant effect, whether the midden remains frozen all summer long or merely remains

frozen longer into the summer months, could be one of vegetative retardation. Thus, while positive cropmarks (redder reflectance) will occur over archeological middens in temperate zones, negative cropmarks (brighter reflectance) are to be expected in Arctic zones (Fig. 13).

FIELD INVESTIGATIONS: This summer, in conjunction with our mapping program, we will collect preliminary data for understanding the mechanism producing the distinctive reflectance at the late prehistoric village locations. Transects will be set up across the sites. At stations along these transects plant communities will be described in detail and photographed on 35 mm color infrared film. Plant samples will be collected at regular intervals and at each collecting station along the transects, soil characteristics will be determined. Presence/absence and depth of permafrost and soil profile will be recorded at each station through soil coring. Lutz (1951) has noted that phosphate was tremendously concentrated in two archeological midden sites in Alaska and many other researchers have successfully utilized phosphate and pH tests in locating settlements (e.g. Woods, 1975, 1977; Edit 1973; Schwartz 1967). pH and phosphate will be measured at each coring station. Transect lines will be extended well beyond the limits of the area producing the bright return to identify critical changes in soil and vegetation characteristics across the boundary. Color infrared 35 mm aerial oblique photographs of one or more site areas will be taken throughout the growing season to determine optimum timing for site discrimination. Depending on the results of the preliminary study, a more detailed grid sampling evaluation program will be developed for the 1980 field season and will enlist the assistance of a soil scientist and plant ecologist.

POSSIBLE RESEARCH SIGNIFICANCE: If a distinctive signature can be identified with archeological midden deposits from small scale color infrared photographs cultural resource managers and researchers alike will be able to inventory large areas rapidly and inexpensively for the potential for such sites. Midden deposits indicate an intensity of occupation, generally productive of great numbers and variety of material cultural remains. The identification of archeological middens from aerial photos may provide a means of maximizing returns for the research dollar. If frozen or late thawing midden material proves responsible for the bright returns on the FCIR aerial photographs, it may be possible to identify early occupations with organics preserved, provided these early middens have not undergone excessive freeze-thaw cycles causing compaction of the midden and are not buried so deep as not to effect plant growth.

OTHER USES OF SMALL-SCALE INFRARED PHOTOGRAPHS: Fig. 10 is approximately a 4x magnification of a 1:36,800 color infrared N.O.A.A. photograph of the end of the spit at Point Barrow, the site of the historic settlement of Nuwuk, which was abandoned sometime between 1936 and 1953. Archeological collections have been obtained from the site at various times in the past, almost always by purchase. (Murdoch in 1890, Stefansson in 1912, possibly by Van Valin and Leffingwell between 1917 and 1919, by Ford in 1932). Carter excavated at Nuwuk in 1953, Jacobsen surface-collected the site in 1961, and Stanford tested the area in 1968. Extensive vehicle activity and storms overwashing the point have obliterated almost all surface indications of the previous occupations and the beach is unvegetated except for a stabilized dune area on the east. At 4x magnification the formation of the spit is evidenced by sequential beach lines (modern vehicle tracks are also visible). Apparent housepits are aligned along the beach lines and chronological ordering of house remains may be possible. Ford (1953:243) notes that "the Nuwuk and Utkiavik sites, which because of the nature of my collection have had to be treated as representing a single time period, actually were occupied for several centuries". In 1953 Carter excavated along the eroding cutbank above the beach at Nuwuk. At that time, Carter counted 46 house pits at Nuwuk but noted that one severe storm alone since 1953 caused the point to retreat 13 meters. Carter cautions that the number of house pits at Nuwuk available for future investigations will be markedly reduced but allows that "there may be other house or midden locations not apparent on the surface" (1966:9). Suspicious features can be rapidly identified for investigation from the photos even though they are undifferentiated on the ground. The criss-crossed blobs and lines visible in Fig. 11 (approximately 8x and 16x magnification) may be trenches and pits dug by Eskimos working under the direction of Charles Brower for Stefansson and later for Ford. Southwest of this area is a feature which seems to be an undisturbed housepit with entrance tunnel. Two abutted square dark areas appear in the vegetated area on Fig. 10 and may also be housepits. Thus, although surface indications and the historical record of Nuwuk would indicate that not much of significance remains, the small scale color infrared photographs indicate that chronological ordering of existing collections may be possible if scientific excavations are conducted at the site and that some intact structures may remain.

Ford first visited the Nunagiak site, located about 20 miles northeast of Wainwright, in August 1931. At that time Ford purchased Punuk style ivory specimens from an Eskimo family "mining for artifacts" near Mound C (see Fig. 12:upper). In 1936 Ford had the opportunity to excavate a test cut in this area of the site and recovered artifacts from the base of Mound C which caused him to comment (1959:64):

"The resemblances to Punuk Period artifacts from St. Lawrence Island are most striking. Too many identifiable objects of Punuk type came from this one locality in the Nunagiak Site for this to be an example of simple trade. It appears more likely that the deposit at the base of Mound C represents the dwelling of an Eskimo family who, in the Punuk Period, emigrated either from St. Lawrence Island or from the Chukchi Peninsula where art and artifact forms were very similar."

Relying primarily upon trait comparison, Ford derives Canadian Thule culture from Birnirk which he in turn derives from Okvik/Old Bering Sea cultures. The Punuk locality at Nunagiak is potentially significant for establishing the chronological position of Punuk in relation to the culture sequence established by Ford for the Point Barrow region. Ford recovered four non-Punuk harpoon heads (2-Thule Type 2; 1-Sicco, 1-Natchuk) from the lagoon-level timbers in the Punuk locality. Unfortunately, Ford cannot with certainty determine whether these harpoon heads were in direct association with the Punuk artifacts or whether they washed out of Mound C to lodge with the Punuk artifacts at lagoon level (1959:66). As this locality is the only Punuk settlement known on the Northwestern shore of Alaska, I visited the site during the summers of 1976, 1977, and 1978 to determine how this rare resource was enduring. It is apparent that the flooding and erosion which Ford noted at this part of the Nunagiak site in 1931 and 1936 still occurs and considerable bone and midden material is visible in the shallow near-shore water of the lagoon. The severity of natural erosion to this important locality could not be ascertained by me, however, despite my yearly visits. Figure 12:lower is a photograph taken through a Bausch and Lomb stereo-zoom transfer scope. Scales for Ford's 1953 topographic map of the Nunagiak site and the FCIR aerial photographs were matched and the images superimposed. The accuracy of Ford's 1953 map is readily apparent, his mounds align perfectly with ground features visible on the aerial photograph. Two areas of active erosion are obvious on the superimposed photograph (these areas are indicated by arrows on Figure 12:upper). The dark area in the upper right hand corner of Figure 12:lower is a lake. Ford's 1953 contour lines of the southwestern shore of this lake lie approximately 100 feet northeast of its present shoreline. The lake has migrated this distance over the last 26 years. The lagoon has also migrated to the southwest and is actively eroding Mounds A, B, C, and D. In the vicinity of the Punuk period house, shoreline erosion since 1953 can be estimated at almost 50 feet. The darker areas on the mounds attest to the continued depredations of artifact hunters. Figure 12 indicates that even small-scale photographs can be utilized by managers to monitor natural and human agents affecting the integrity of known cultural resources.

CONCLUSION: Archeologists have tended in the past to examine aerial photographs for cultural features, not settlements, hence the imagery most archeologists ask for or recommend is larger scale than most agencies and other resource specialists obtain (Harp 1977:114; Andrews 1977:54). The photographs of the late prehistoric lake sites in NPR-A suggest that in our use of aerial photos we may be missing the forest by looking for trees. The aerial photos of Nuwuk and Nunagiak indicate that even site features are discernible on small scale imagery. A major effort is required to train ourselves how to look for and identify cultural sites and features on small scale photographs. BLM's Division of Photogrammetry in Anchorage is in the process of obtaining high quality 1:60,000 color infrared and 1:120,000 panchromatic coverage of the entire state of Alaska. These photographs are already available for large portions of the site and provide a research tool we all should investigate more thoroughly.

Acknowledgements: I wish to thank Bill Fowler of the BLM Fairbanks District for his technical assistance during my impatient struggles with the stereozoom transferscope and for taking the photographs of Nuwuk and Nunagiak. Harvey Shields of the National Park Service also receives my thanks for providing his fieldnotes for Kinyiksukvik. Ed Hall is to be thanked too for his willingness to share his knowledge and familiarity with northwestern Alaskan archeology. Any deficiencies of this paper are, of course, my own alone.

A note on the figures: The aerial photos reproduced here are direct Savin 780 copies of 9"x9" color contact prints. The photos of Nuwuk and Nunagiak are Savin 780 copies of black and white and color Polaroid photos of 9"x9" color contact prints taken through the transferscope. I am in the process of obtaining clearer photos for publication.

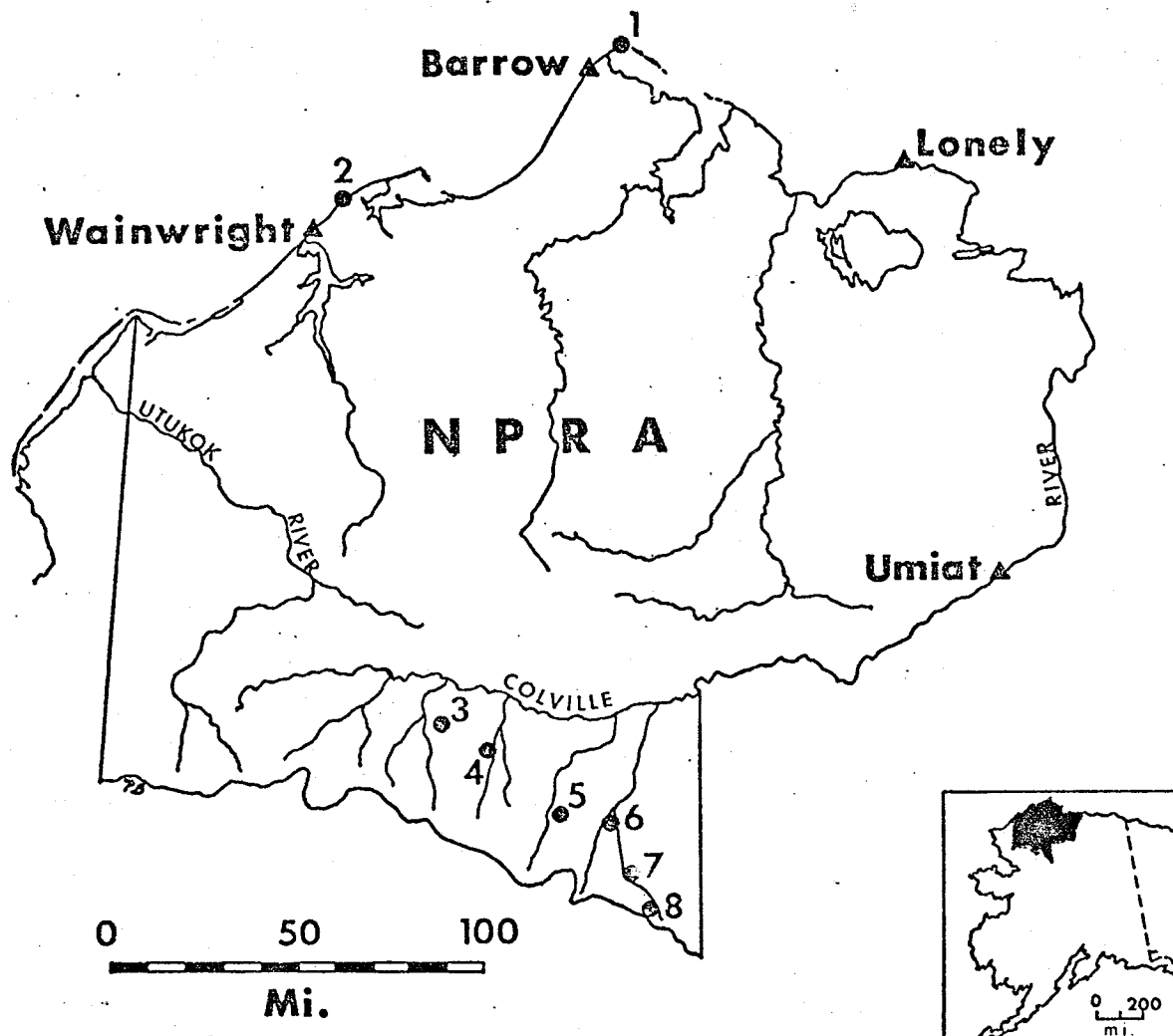


FIGURE 1: NATIONAL PETROLEUM RESERVE- ALASKA

1. Nuwuk
2. Nunagiak
3. Liberator Lake
4. Swayback Lakes
5. Tukutu Lake
6. Betty Lake
7. Kinyiksukvik
8. Etivluk Lake

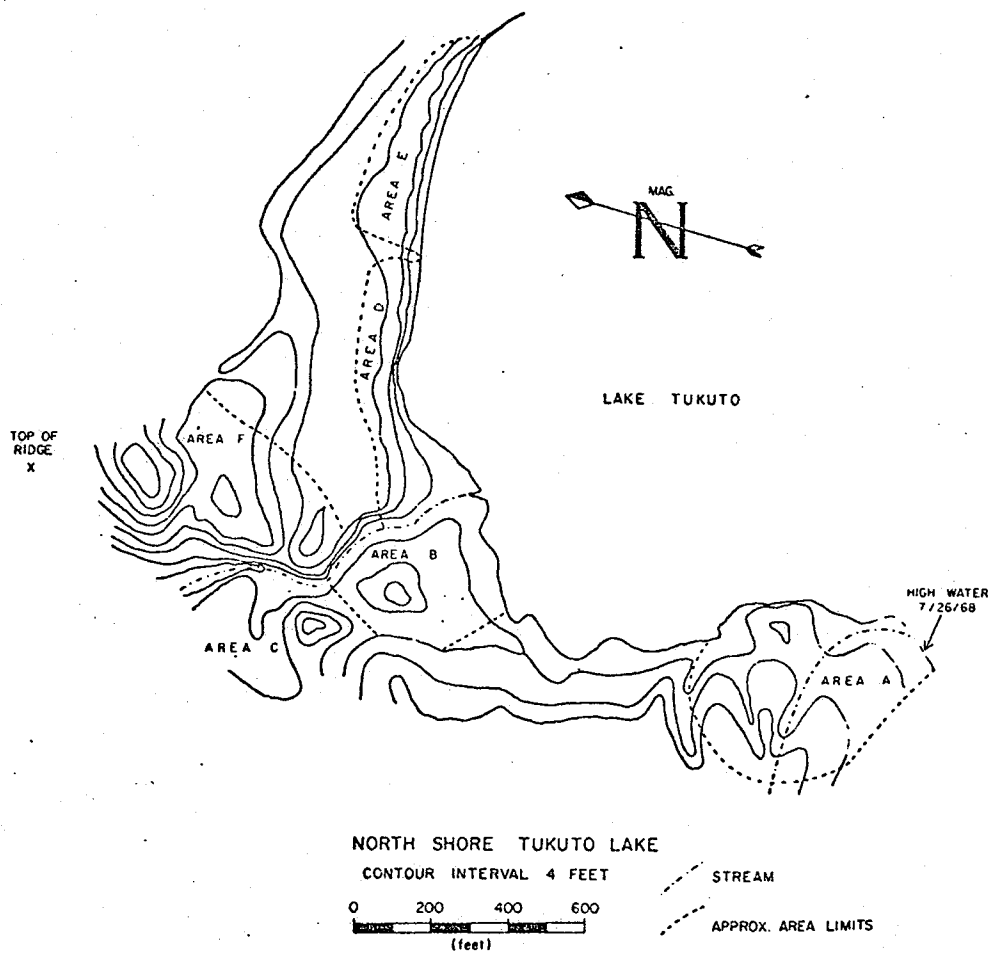


FIGURE 2: Archeological Areas at the North End of
Tukutu Lake

(taken from Hall 1976: 104 Fig. 1)

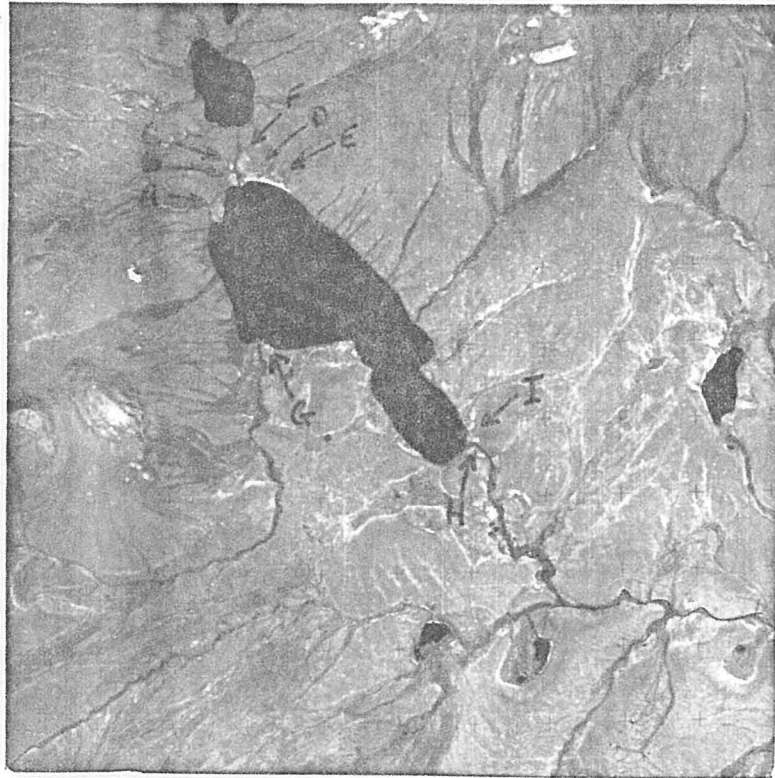


FIGURE 3: Tukutu Lake FCIR

above: 1:60,000 FCIR flown on July 19, 1977
below: 1:120,000 FCIR flown on July 19, 1977

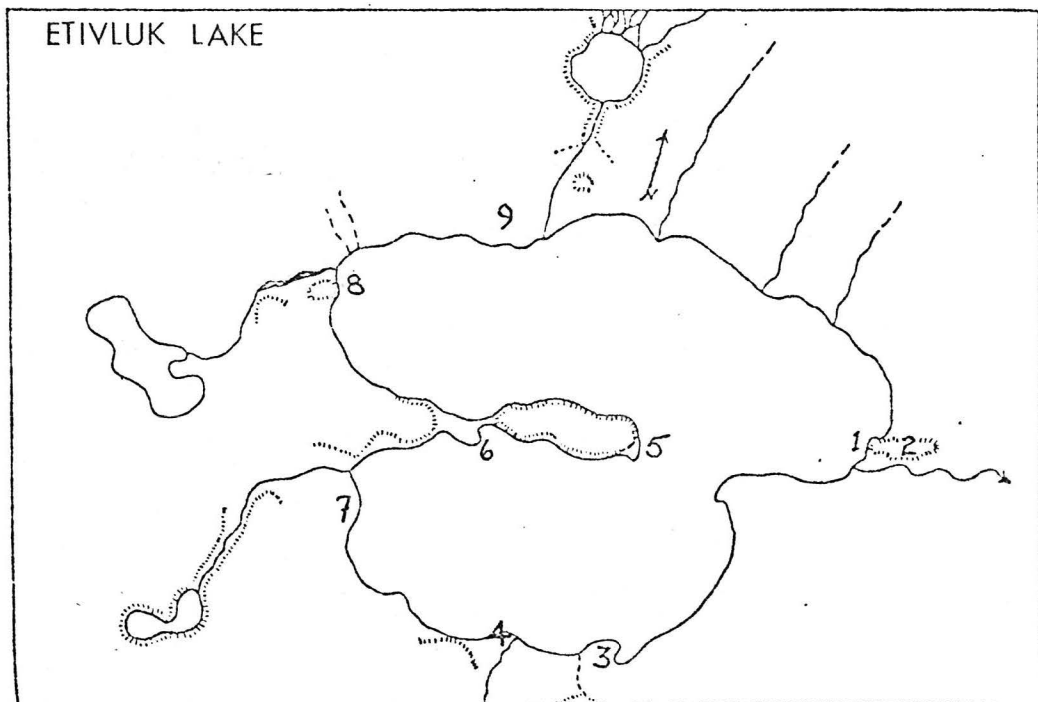


FIGURE 4: Archeological Sites at Etivluk Lake
(redrawn from Irving 1964: 72)

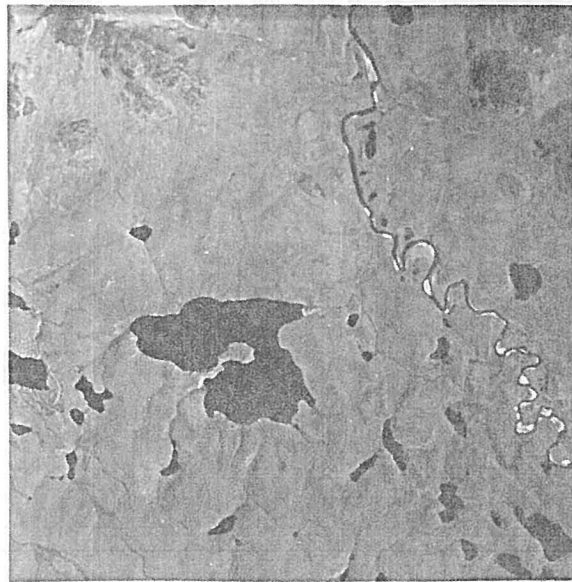
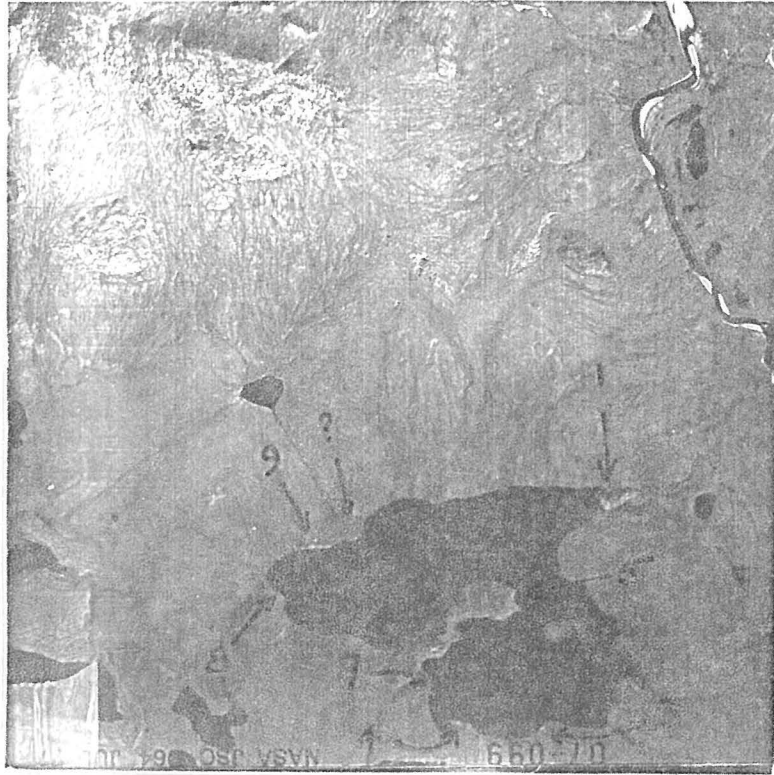


FIGURE 5: Etivluk Lake

above: 1:60,000 FCIR flown on July 19, 1977
 below: 1:120,000 FCIR flown on July 19, 1977

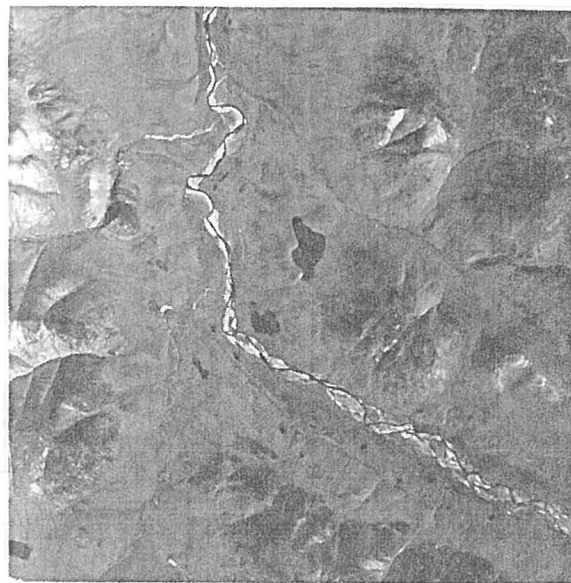
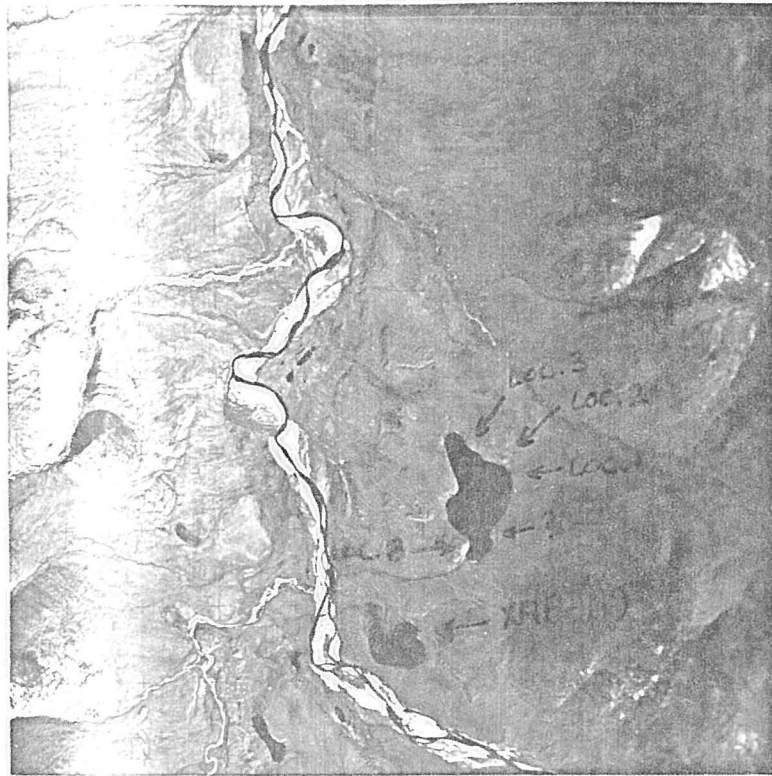


FIGURE 6: Kinyiksukvik

above: 1:60,000 FCIR flown on July 19, 1977
below: 1:120,000 FCIR flown on July 19, 1977

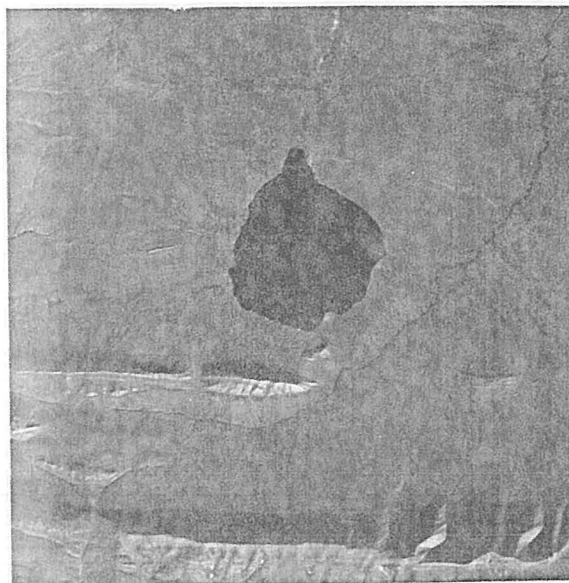


FIGURE 7: Liberator Lake

above: 1:60,000 FCIR flown on July 26, 1977

below: 1:120,000 FCIR flown on July 26, 1977



FIGURE 8: Swayback Lake

above: 1:60,000 FCIR flown on July 26, 1977
below: 1:120,000 FCIR flown on July 19, 1977

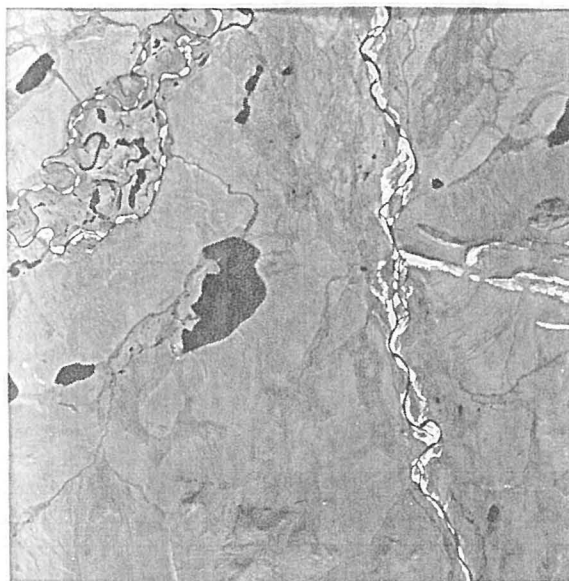
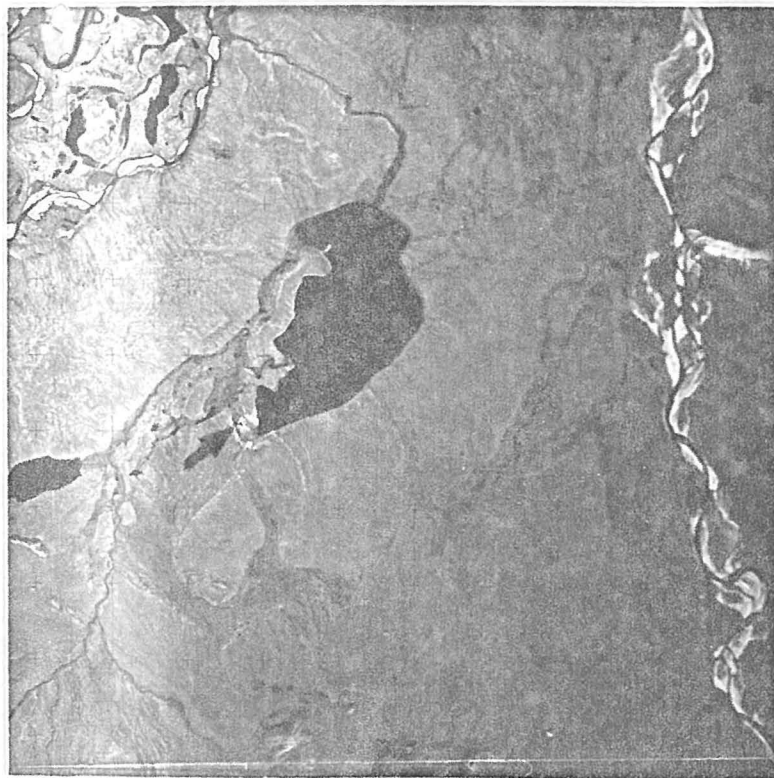
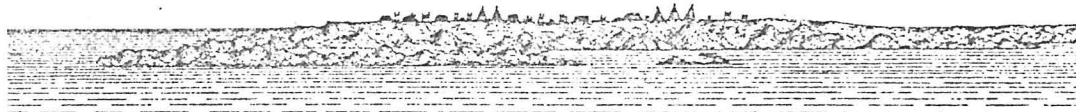


FIGURE 9: Betty Lake

above: 1:60,000 FCIR flown on July 19, 1977
below: 1:120,000 FCIR flown on July 19, 1977



POINT BARROW, A. T.
 Bearing E., (mag.) dist. 1/2 mile.
 From a sketch by Captain C. L. Hooper, U. S. R. M.

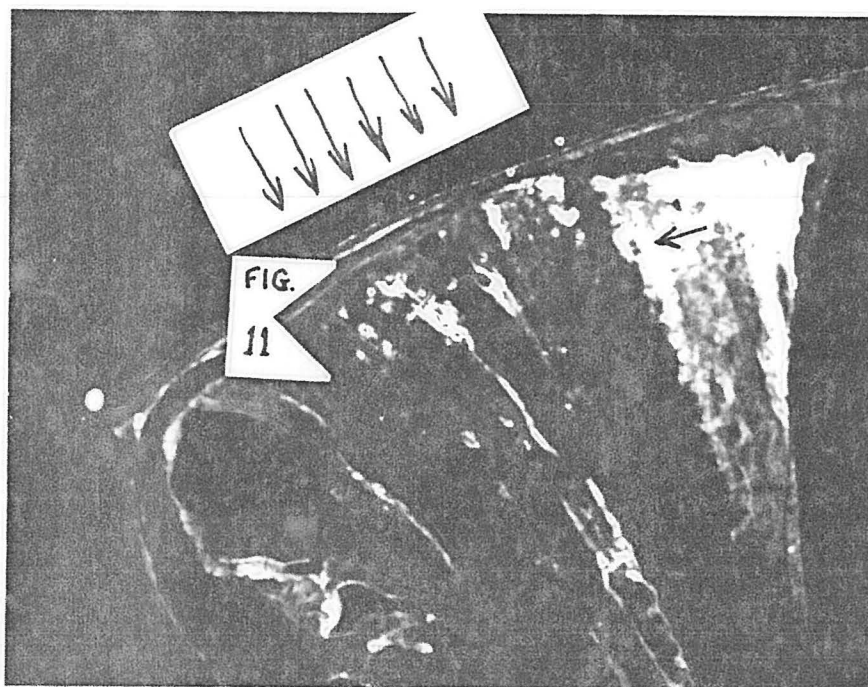


FIGURE 10: NUWUK

above: as it appeared to Hooper August 25, 1880 (reprinted from
 Hooper 1880)

below: 1:36,800 FCIR photograph magnified approximately 4x

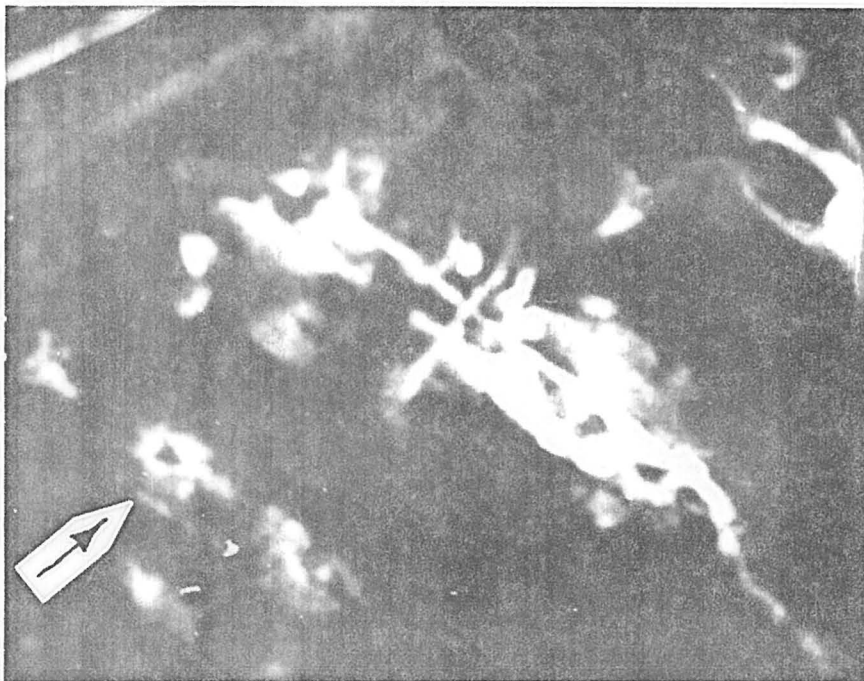
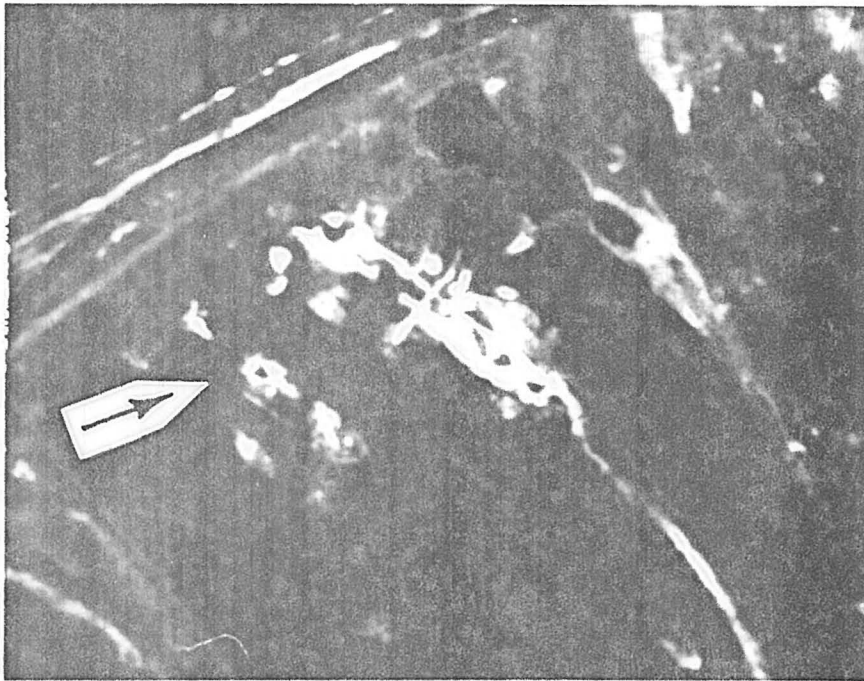


FIGURE 11: Nuwuk 1:36,800 FCIR

above: approximately 8x magnification
below: approximately 16x magnification

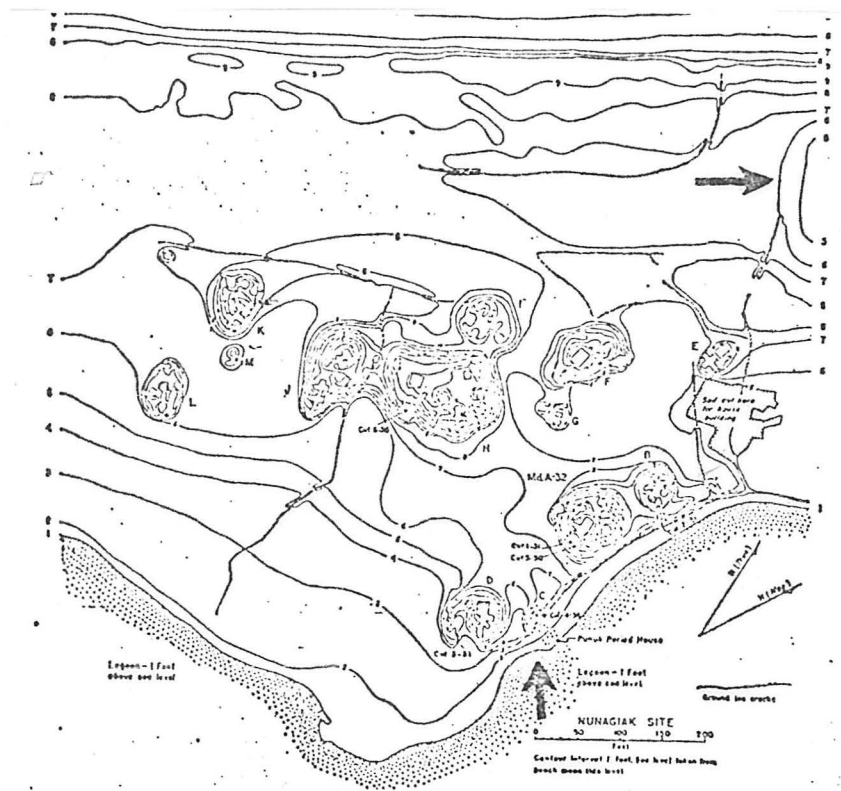
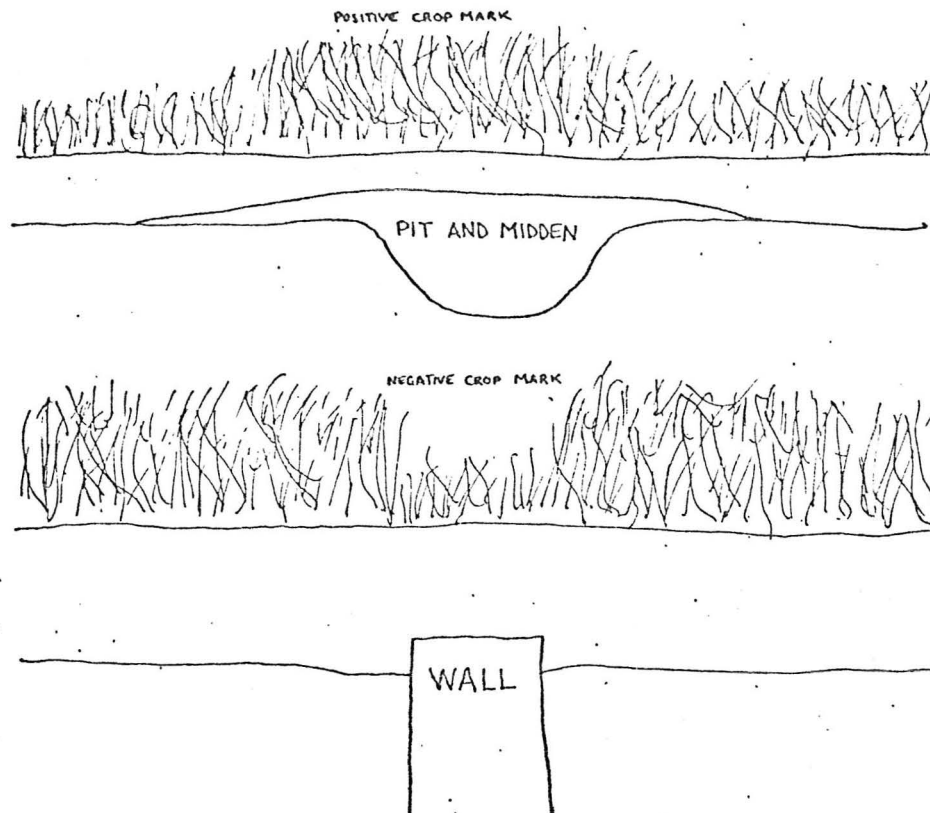


FIGURE 12: Nunagiak

above: map of site drawn by Ford in 1953; arrows indicate areas of active natural erosion
(reprinted from Ford 1959: 57 Fig. 19)
below: Ford's 1953 map superimposed on 13x magnified N.O.S. 1:36,800 FCIR photograph obtained July 23, 1977.

A. TEMPERATE ZONE: CROP MARKINGS



B. ARCTIC ZONE: HYPOTHESISED REVERSAL

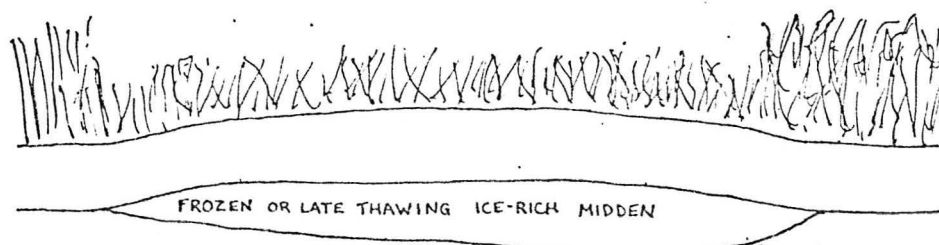


FIGURE 13

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RESEARCH DESIGNS IN CULTURAL RESOURCE MANAGEMENT:

PREDICTIONS AND CAUTIONS

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Paper presented at the 6th Annual Alaska Anthropology Conference,

Fairbanks, Alaska, April 6-7, 1979

There has recently been a display of considerable interest in the role of research designs in cultural resource management. Published articles have reviewed the concept and its current application (Goodyear et al. 1978) and have discussed the utility of research designs for evaluating significance of cultural resources (Raab and Klinger 1977; Glassow 1977). Several authors have mentioned regional research designs, generally stressing the potential they have for providing a theoretical framework to which the results of numerous small scale clearance type projects can be addressed (McMillan et al. 1977:28; Lipe 1974:236-238; Goodyear et al. 1978:163). The topic of research designs has also been discussed at several meetings of agency cultural resource specialists, where it has usually generated considerable interest.

It is often somewhat difficult to understand precisely what is meant by the various speakers and articles, particularly when the discussion deals with regional research designs. For example, Goodyear et al. (1978:161) provide a definition of research design which would probably be generally acceptable:

Basically, a research design is an explicit plan for solving a problem or set of problems. It is a plan that must contain theoretical goals in the form of a specific problem or hypothesis, relevant analytical variables, and specification

of data that will allow empirical testing. To be complete, the design must lay out the methods and techniques for acquiring and analyzing the data, and predict the expected outcomes of the analysis.

A research design can thus be seen to be a plan of attack which specifies the manner in which a particular research question or set of questions will be approached. However, these authors appear to be somewhat at odds with themselves in their discussion of "standing research designs." Presumably, a standing research design is a type of research design, and must therefore possess the characteristics specified above. Yet these authors describe a standing research design as a general areal design, model, or set of research problems, and go on to suggest that regional or topical overviews, while not really research designs, may function as such (Goodyear et al. 1978:163). Surely it is well beyond the scope of most regional overviews to deal with such concerns as specific plans for solving research problems and the methods of data recovery and analysis appropriate to these questions. A regional overview is not a plan of attack for approaching research questions, so in what fashion can it legitimately function as a research design?

This type of contradiction emphasizes the fact that discussions of regional research designs have involved two very different types

of documents, or at least two very different applications of the same sort of document. One, which constitutes a genuine research design, is a plan of attack for dealing with research questions of a regional nature, such as settlement pattern analysis and subsistence system studies. The second type, which is not strictly speaking a research design at all, is a more general document whose primary purpose is to assess the current state of knowledge in an area and to attempt to define the research questions which can or might be answered from the data base in that area. Rather than being a plan of attack upon some research question, a document of this type is primarily a management tool used for evaluating the resource base. It provides a basis from which the research potential of a particular site can be determined, and may allow for the assessment of relative significance among sites in the area. Both conceptions of what a regional research design is or ought to be seem to be included in current discussions of the topic, often without making a distinction between them. It is useful to make this distinction, however. Borrowing terms from Goodyear et al. (1978) and amplifying what is an implicit distinction in their article, it is possible to contrast "standing" research designs and "regional" research designs.

A standing design is a broad general document which assesses the current state of knowledge in an area and which specifies the research potential of an area by attempting to detail the

sorts of research questions which can be expected to be answered by the data base in that area. A regional research design, in contrast, is a specific plan for addressing a particular research question or set of questions of a regional nature. While both concepts seem to be involved in current discussions of regional research design, and while both types of design have a legitimate role to play in cultural resource management, it is primarily the standing research design which will be dealt with here, because this type of design has the more far-reaching implications for the profession.

There is good reason to believe that the standing research design is the type that will be most often produced by land-managing agencies in the coming years, since it best serves the needs of these agencies. The various land-managing agencies, despite widely varying legal mandates, are basically all involved in allocation of the use of public lands and resources located on those lands. This is a task which requires agencies to be able to evaluate the various resources in order to make intelligent decisions regarding utilization of the resources. This is particularly true of multiple-use agencies, which must often attempt to deal with mutually exclusive uses of the same resource or of different resources located in the same area. Obviously, an agency cannot be expected to make intelligent de-

cisions about the mineral resources located on its lands without first determining the relative value of these resources, both with respect to all other mineral resources and also in relationship to non-mineral resources. The situation is precisely similar with respect to cultural resources, the only significant difference being that the value of cultural resources is not primarily an economic one, but is determined by the research potential of the resource.

Agencies are already involved in this sort of evaluation of cultural resources, although to a relatively minor degree. To date, the evaluation process consists of little more than determining whether or not a site is eligible for the National Register in order to define agency responsibilities with respect to Section 106 of the National Historic Preservation Act. Criteria for eligibility being what they are, it is possible to argue that any archaeological site is eligible, but at least the process of justifying a site's eligibility does require some sort of reference to its research potential.

Research designs have been used more or less successfully to determine significance in fairly circumscribed areas, generally as part of compliance-related work (Grady 1977; Hickman 1977), and some attempt has been made to derive Register significance from explicit research designs covering large areas (Wilson 1977). However, this evaluation process most often

occurs in a piecemeal fashion. Evaluations are made by one or a few individuals and represent their understanding of the current research situation. Because it is unlikely that any one individual can truly appreciate the entire range of research potential in an area of any size, the current situation necessarily entails the real possibility that certain kinds of sites or certain methods of utilizing sites' research potential will be excluded from agencies' determinations of what is important. This may not be a major problem at present, but in the long run the effects of this piecemeal approach to evaluation of the resource base could be severe.

Present writings clearly indicate that the future of cultural resource management will involve more than the National Register and Section 106 compliance. Strong calls have been made for preservation of portions of the resource base as a data bank for future research (Lipe 1974; McMillan et al. 1977), even to the point of advocating that no sites should be excavated at all unless they are already endangered (Christenson 1979). There is a growing feeling that the profession must begin to concern itself with the effects it is having on the resource base in addition to worrying about impacts from outside the profession.

However, as cultural resource management matures beyond the compliance stage, and as agencies begin to develop comprehensive programs for the management of cultural resources which

take into account concerns for preservation and wise use of the resource, it will become more and more critical that they develop sound mechanisms for evaluating the resource base over large management units. It is in this application that standing research designs will play a crucial role in cultural resource management, for they will become the primary evaluation tool which will be used to make decisions regarding allocation of cultural resources. That is, in the long run, it will be these standing research designs which will be used to determine who will be allowed to excavate which sites.

One example of an attempt to begin to come to grips with the problem of evaluation of the resource base is the Bureau of Land Management's cultural resource program. Within this program, a number of categories of different uses to which any given site might be put have been created. These include: 1. socio-cultural use, 2. current scientific use, 3. management use, 4. conservation for future use, and, 5. potential scientific use. As the Bureau program is envisioned, these evaluations will be made from the basis of the Class I inventory, which is a literature-based regional overview, portions of which constitute a standing research design (Bureau of Land Management 1978).

Thus, standing research designs can be seen to be a necessary, useful and desirable management tool which are likely

to play an increasingly important role in cultural resource management in the future. The benefits to the profession from development of such designs are apparent, since they will make explicit and consistent over large areas the grounds on which agencies are evaluating the resource base.

In general, discussions of the role of research designs in cultural resource management have concentrated on the benefits to be derived from their application, and with few exceptions no one has seemed to be concerned with potential problems and difficulties from their use. Lipe (1974:238) briefly mentions one of these problems, the possibility that such designs could promote a "party line" in research which might tend to reduce the profession's ability to change and grow. Outside of this, there seems to be little awareness of the potential problems involved, and yet it appears clear that standing research designs used as management tools could have a significant deleterious effect on the profession's ability to pursue research goals.

There are essentially three sources of potential barriers to the profession's ability to pursue research that may be created by agencies' use of standing research designs. Two of these are avoidable if such designs are carefully applied, but the third is an inevitable result of the resource base's very

nature.

The first and perhaps most obvious source of potential barriers to research is the fact that some portion of the standing research designs created by agencies are likely to do an inadequate job of assessing the full range of research potential in an area. If these designs are then used as the basis for management decisions regarding allocation of the resource base, it is probable that it will become difficult or impossible to pursue certain research questions on lands managed by that agency.

There is a second source of difficulties associated with the application of standing research designs in that even adequate designs may tend to become "ossified" with time, and will cease to accurately reflect the research potential of the area they cover. This would tend to create the same potential for inappropriate management decisions as would a research design that was not adequate to begin with.

Finally and most critically, it is inevitable, in the long run, that standing research designs will be used as the basis for denying access to the resource base. As the resource base shrinks, agencies that are attempting to make an honest effort to preserve portions of the data base will be forced to become much less accomodating to researchers. They will be forced to

begin dealing with such difficult problems as deciding when proposed research is significant or important enough to justify utilization of an ever dwindling resource base. In fact, some current authors are already advocating the formation of groups to determine "legitimate" research goals (King 1977).

That decisions of this magnitude may not have to be made in the immediate future, particularly here on the last frontier where the resource has not been as severely depleted as elsewhere, is not a valid reason for assuming that standing research designs currently being created are not of critical importance. Current standing research designs may have strong influences on future access to the resource base in several ways.

First, knowledge of the extent and nature of the resource base is often not so well developed that it is possible to determine how critical it is to begin preserving some portion of it. It may very well be that in sparsely occupied areas there are not that many sites to begin with, and hard decisions regarding access to the resource may need to be made much sooner than might be expected. Also, managing agencies may very well adopt a cautious approach to allocation of the resource until such time as they develop a better idea of its extent and this might also lead to decisions restricting access being made sooner

rather than later.

Second, current standing research designs may easily evolve into future designs, and biases and insufficiencies may be perpetuated into the time when the designs are being used to restrict access to the resource.

Finally, current standing research designs can affect future access to the resource base because they will be used to determine which sites are preserved for future use. The resources that will be available in the future for exploitation are likely to be a direct result of the research designs currently being produced, and if these designs are not adequate there is a real potential that resources will not be available for certain research questions in the future.

Despite these potential problems, it is not feasible to advocate that agencies avoid the creation of standing research designs. Agencies must develop a tool for evaluating the resource, and since the preeminent value of that resource is its research potential, this tool must be some form of research design. It is definitely preferable that this design be an explicit and consistent one rather than the piecemeal, inconsistent and implicit approach which all too often characterizes current evaluations. To advocate that agencies not create standing research designs seems analogous to suggesting that they should try to manage

timber or forage resources without reference to their economic value.

It is necessary that the profession understand the implications of the use of standing research designs and be aware of the potential problems involved with their use. Further, there are a number of specific recommendations that can be made which will help to alleviate or avoid these problems:

1. Agencies, and particularly agency cultural resource specialists have a clear obligation to see that standing research designs receive the widest possible input from the profession. This will help to insure that the full range of research potential in an area is considered in the evaluation process.
2. Non-agency members of the profession have an obligation to provide input to standing research designs, and to be aware that they are much more than a better way to make National Register nominations.
3. There is a definite need for inter-agency coordination in the creation of standing research designs so that decisions regarding access to the resource base can be made on the basis of the total resources present in an area and not just on the basis of the resources managed by a single agency.

4. The profession should make every attempt to ensure continuing access to resources located on private lands. In the event that agency decisions regarding access to cultural resources present an insurmountable barrier to certain types of research or to particular research projects, privately owned resources may be the sole source which can be utilized for research.

5. Agencies should consider the designation of resources for preservation on the basis of considerations in addition to presently perceived research potential. Glassow (1977) presents one such alternative which may have significant value.

6. Agencies must adopt procedures to avoid the "ossification" of standing research designs. Such designs should be periodically reviewed by both agency specialists and by the profession in general to ensure that they remain current.

7. Agency specialists must be extremely careful to maintain the proper attitude toward standing research designs. They should not be viewed as the final arbiter of what constitutes valid research, but as a tool for evaluation. As such, they should attempt to reflect what the major user group, the research archaeologists, feel is important.

Consequently, a proposal for a research project which is not covered by the research design should not be rejected out of hand as invalid research, but should be carefully evaluated to determine if it in fact represents significant research questions that were not anticipated by the standing research design.

8. The profession at large should consider the development of their own standing research designs, which can serve as a basis for providing input into agency designs, as well as a possible forum from which to question the adequacy of agency designs. The recent formation of a National Association of State Archaeologists, with the avowed purpose of creating regional research designs is an example of a professional group doing just this.

9. Finally, and perhaps most important of all, the profession must develop an active advocacy stance with respect to public cultural resources. Public agencies are susceptible to political pressures, and the ultimate tool which the profession has to influence agency decisions regarding management of cultural resources is a more or less concerted display of concern over these decisions. This will require the profession to stop treating agency activities as if they were of little or no importance and to realize the

ultimate importance of agency decisions to the profession. Because of the potential importance that standing research designs will have in influencing agency decisions, they constitute a logical point on which the profession should concentrate.

With careful consideration of the long-range implications of standing research designs, and with adequate and active participation of the profession, it should be possible to develop such designs in a manner that will allow agencies to begin managing cultural resources in a comprehensive fashion, and that will provide a basis from which reasonable decisions can be made to accomodate both the need for current research and the need to preserve our data base for future researchers.

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ABSTRACTS

Gal, Robert (NATIONAL PETROLEUM RESERVE -ALASKA ARCHEOLOGIST BUREAU OF LAND MANAGEMENT) STRATEGIES FOR SITE DEFINITION: THREE EXAMPLES. Obtaining archeological field data involves three distinct endeavors: 1) locating archeological sites (testing space: survey) 2) defining the limits of archeological sites (site testing) in order to 3) draw meaningful data from archeological sites (excavation). A review of the literature indicates that the second task is seldom considered.

The demands of cultural resource legislation for evaluating the significance of archeological sites, exacerbated by growing acceptance of a conservation model for archeology and explicitly anthropological theoretical research interests, demand that archeologists review and refine their spatial models of settlements and concomitant strategies and methodologies for defining the physical limits of cultural resources prior to excavation.

YES

Three examples of different procedures and approaches to the definition of archeological resources, after initial discovery, are discussed. One example is drawn from work conducted for Alyeska during pipeline construction, two examples are drawn from NPR-A excavations. The assumptions, advantages, and shortcomings of each example are discussed in relation to the ethical responsibilities of the archeological contractor to the profession, to industry, and the Federal Government.

Bowers, Peter M. (WASHINGTON STATE UNIVERSITY and BUREAU OF LAND MANAGEMENT, NPRA PROJECT) THE CARLO CREEK SITE: A FINAL REPORT. The Carlo Creek site is a small, early Holocene site located in the upper Nenana River valley, Central Alaska Range. Investigations of this deeply buried and frozen site in 1976-77 indicate it was occupied ca. 8500 radiocarbon years ago, and functioned primarily as a butchering site and lithic workshop. The lower of two cultural components contains well preserved faunal remains (Rangifer, Ovis, Citellus), 2 hearth areas, and a lithic assemblage consisting of elongate argillite bifaces, blade-like flakes, and more than 8,000 waste flakes. Initial site occupation occurred on a braid bar of the Nenana River, during a period of postglacial downcutting and terrace formation. Subsequent to the site's abandonment, it was covered by more than 4 meters of floodplain sediments. No definite technological/cultural affinities can be established for either cultural level, although the lower component may relate typologically with the biface industry of Dry Creek II, and possibly with an early Holocene phase of the Denali Complex.

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